

Idaho Agricultural Best Management Practices

A Field Guide for Evaluating BMP Effectiveness



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Sponsored by:

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Introduction



BACKGROUND

Over 20 years ago, in December 1981, the following administrators signed a memorandum: Lee Stokes, Administrator of Division of Environmental Quality; Wayne Faude, Soil Conservation Commission Administrative Officer; and Amos Garrison, USDA Soil Conservation Service State Conservationist. The memorandum initiated implementation of a standard process for evaluating water quality impacts of best management practices (BMP). The intent was to officially implement BMP effectiveness monitoring and evaluation within Idaho's State Agricultural Water Quality Program.

Little attention was paid to BMP effectiveness until 1990 when the Division of Environmental Quality published The Coordinated Nonpoint Source Water Quality Monitoring Program for Idaho. This document outlined monitoring and evaluation responsibilities for designated agencies. The Idaho Soil Conservation Commission was named as the lead state agency for development, implementation, and evaluation of agricultural BMPs. The publication's recommended objectives for BMP effectiveness emphasized the need for an interdisciplinary team, discussed potential timing, frequency of evaluations, and operations and maintenance. Only the grazing/riparian recommendations outlined specific evaluation parameters.

In the years since 1981, BMP effectiveness evaluation efforts faltered due to limited resources, lack of staff, focus on promoting BMP implementation, program expansion and agency priorities.

Water Quality Law, Idaho Code Section 39-3621¹ states that the Idaho Soil Conservation Commission (the designated state agency for agriculture and grazing activities), in cooperation with appropriate land management agencies, is responsible for ensuring agricultural best management practices are monitored for their effect on water quality. BMP effectiveness evaluation has been identified as imperative for the validation of successful TMDL implementation within the agricultural sector.

OVERVIEW

Evaluating the effectiveness of agricultural BMPs directly relates to the technical standard of the practice. Each BMP has a **purpose** defined within the technical standard; for example, to reduce erosion or trap sediment, a specific purpose is defined. Evaluating how effectively the applied BMP serves its purpose will indicate its level of efficacy.

This field guide provides guidelines for evaluating site specific BMPs and the cumulative effects of BMPs within a watershed. A comprehensive evaluation of BMP effectiveness requires the integration of three types of monitoring: onsite evaluation of practice effectiveness; pollutant source and transport monitoring; and instream beneficial use assessment and water quality monitoring. The focus of this document is the onsite BMP evaluation process.

Focusing on agricultural BMPs used within Idaho, this field guide covers four categories of agricultural activities common throughout the state: irrigated cropland (Chapter 2), nonirrigated cropland (Chapter 3), grazing (Chapter 4), and waste management systems (Chapter 5). The riparian and wetland land use category is also discussed (Chapter 6).

¹ Idaho Code Title 39 (Health and Safety), Chapter 36 (Water Quality), Section 3621 (Monitoring Provisions).

Chapters follow this overall outline:

- Selected BMP and its general definition
- The purpose of each BMP
- Suggested methods for performing BMP effectiveness evaluation and documentation

BEST MANAGEMENT PRACTICES

The Agricultural Pollution Abatement Plan² (Ag Plan) is the source for BMPs for the control of nonpoint sources of pollution from agriculture.³ The Ag Plan defines a BMP as a practice, or combination of practices, determined to be the most effective, practicable means of reducing the amount of nonpoint source pollution generated by agricultural activities.

For a BMP to accomplish the task of reducing nonpoint source pollution it must meet three criteria. BMPs must be: technically feasible, economically feasible, and acceptable. By meeting all three of these criteria the BMPs are defined as practicable.

BMP SELECTION

The USDA Natural Resources Conservation Service (NRCS) Field Office Technical Guide (FOTG) is the source of BMP component practices accepted by the Idaho Soil Conservation Commission (SCC) and Idaho Department of Environmental Quality (DEQ) for inclusion in the Ag Plan Catalog of BMP Component Practices. The Catalog, housed and updated by SCC, contains those practices determined to be effective in the treatment of natural resource concerns. The FOTG is maintained in each local NRCS Field Office⁴ and includes the standards and specifications for conservation practices designed and adapted to solve local land use concerns and natural resource problems.

The Technical Standard for each component practice sets forth the minimum limits of technical excellence for its planning, design and construction. The following information is given in the Technical Standard:

- Definition - a description of the character or nature of the practice.
- Purpose - a description of the use of and specific needs filled by the practice in the overall effort to control natural resource impacts.
- Conditions Where Practice Applies - a statement of the specific conditions or pollution control needs that can be met by the practice alone or in combination with others.
- Key Points in Practice Application - a list of special features, ideas and suggestions for practice application such as timeliness, soil conditions, and/or special equipment needs that significantly influence the success or failure of the practice. Key points are practice-specific and may not be included in the standard for all component practices.

² Idaho Agricultural Pollution Abatement Plan, A Guidance Document Addressing Nonpoint Source Water Quality Pollution. March 2003. Sponsored by Idaho Soil Conservation Commission and Idaho Department of Environmental Quality. Prepared by Resource Planning Unlimited, Inc.

³ IDAPA 58.01.02 - Water Quality Standards and Wastewater Treatment Requirements. Section 054.07- Idaho Agricultural Pollution Abatement Plan.

⁴ URL site for Idaho NRCS: <http://www.id.nrcs.usda.gov/>

- Specifications Guide - a statement of where the technical requirements for the planning, designing, construction or application of the practice can be found, i.e. NRCS FOTG. The referenced specifications set forth the required materials, operations and procedures to obtain the desired standards of construction and installation.

Practices are modified or new ones developed when there is improvement in technology through research and demonstration, change in crops and cropping, change in economic conditions, change in social conditions, and/or change in water quality concerns. This is an ongoing process to keep up with technology and needs identified at the local level.

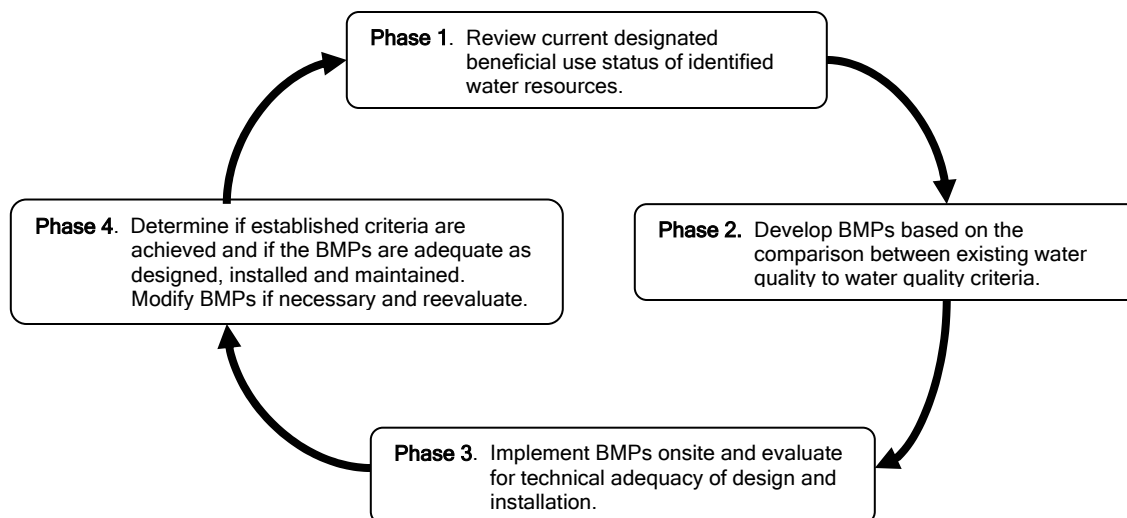
BMP APPLICATION

A BMP is developed for application to a particular site to address a specific nonpoint source pollution concern based onsite-specific data gathered and analyzed by a trained and experienced resource specialist. Site data may include soils, slope, climate, topography, crops grown, equipment used, water quality, water quantity, pests, and resource conditions. The land owner/operator's objectives, site data, and natural resource needs are used to select the BMP that alone, or in combination, will meet the goals for that site. The conservationist or resource specialist may prescribe a number of alternative practices that not only meet the natural resource objectives, but also meet the landowner/operator's needs and capabilities. Because of the distinctive combination of site characteristics and natural resource objectives, the selected BMP and component practice applied is unique.

Feedback Loop

Technical evaluation of applied agricultural BMPs is an integral part of the feedback loop process. The feedback loop process is referenced and described in the Ag Plan, and is a mechanism for overall nonpoint source pollution management based on the implementation and evaluation of BMPs. An important part of any conservation system is the evaluation of applied BMPs. Water pollution reductions and beneficial use improvements achieved through application of BMPs are detected through monitoring and evaluation. When water quality goals are not achieved, monitoring and evaluation is used to determine the need for new or modified BMPs. The feedback loop process occurs in four phases:

- Phase 1. The process begins by reviewing current designated beneficial use status of identified water resources.
- Phase 2. The existing water quality is compared to the water quality criterion established in Step 1. This comparison is the basis for developing or modifying BMPs.
- Phase 3. The BMP is implemented onsite and evaluated for technical adequacy of design and installation.
- Phase 4. The effectiveness of the BMP in achieving the criteria established in Step 1 is evaluated by comparison to water quality monitoring data. If the established criteria are achieved, the BMP is adequate as designed, installed and maintained. If not, the BMP is modified and the process of the feedback loop continues.

Figure: Feedback Loop Process

Chapter 1 - Initializing BMP Effectiveness Evaluation



INITIALIZING BMP EFFECTIVENESS EVALUATION

Nonpoint source pollution can have adverse effects on water quality and/or beneficial uses which may result from the incremental impacts of agricultural operations. BMPs are designed as an individual practice, or combination of practices, determined to be the most effective, practicable means of reducing the amount of nonpoint source pollution generated by agricultural activities.

A BMP may be evaluated individually. Depending on the objective of the implementation program, it may be the program's intent to evaluate one, stand-alone practice. In this instance, the practice is compared to its defined purpose, and an evaluation is performed to see how effectively the practice is accomplishing its intended use.

Conversely, it may be the implementation program's objective to review a set of practices. The resulting reduction in the amount of nonpoint source pollution, or cumulative effects, can result from individually minor, but collectively significant improvements taking place over a period of time. Evaluating the cumulative effects of applied BMPs throughout a given watershed will require the initialization of a review with an understanding of the following components:

- The overall landscape within a watershed;
- The current land use activities within the watershed;
- BMP implementation schedule and distribution;
- The relationship between individual BMPs;
- The relationship between present land uses and current water quality/beneficial use conditions;
- The potential cause-and-effect relationships between land use activities and the stream itself.

GETTING STARTED

Once BMPs are implemented or selected for evaluation, several steps are necessary to follow when designing a BMP effectiveness review. This nine step process is intended to serve as a guide for developing a plan for review.

Step 1: The first step in initializing a BMP effectiveness evaluation is to define the project boundaries. The watershed planner, advisory committee, and/or sponsoring organization will determine, or may have already determined, the project boundaries.

The boundaries are most commonly defined on a watershed scale. This usually includes hydrologic units. A common and widely accepted approach is that defined by the United States Geological Survey (USGS) where the nation is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged from the smallest (cataloging units) to the largest (regions). Each

hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system.¹

Step 2: Once the project boundaries are defined, a map of the watershed is created. Several options are available and include one or a combination of the following:

- USGS topographic map
- Ortho photo quads
- Geographic information system (GIS) created map
- Aerial photography
- Historical coverages
- Farm Service Agency (FSA) annual flights

Step 3: The third step is to identify and locate where the BMPs have been installed. It may also be helpful to include current program contracts and agreements, as well as historic implementation efforts, on the project map.

Step 4: The next step is to identify the location of BMP installation sites in relation to water quality monitoring sites. It is helpful to place both in-field evaluation sites and monitoring locations on the project map (see example—Figure 1, page 1-4).

Step 5: Next, the level of BMP evaluation is selected. Because BMPs may be evaluated at many different levels, it is important to determine the level of evaluation before the formal monitoring plan is developed and evaluation methods and documentation are selected. The level of BMP evaluation is determined by a variety of circumstances, such as resource availability (time, funding, and personnel), desires and needs of project sponsors, and agency mandates (TMDL validation for example). BMP effectiveness evaluation can be grouped into five levels:

Level I: This important, but basic, level of evaluation simply insures that the practice is in place, it works, and it is being maintained. This level is referred to as a qualitative evaluation and may include a combination of tasks, including seasonal or annual site visits and documentation, photo documentation, and an evaluation report qualifying that the practice is meeting the original intended use.

Level II: BMP effectiveness may be evaluated quantitatively by measurements taken in the field. The review of whether the practice is meeting the original intended use (purpose) may be evaluated by a set of measurements. Using the tools defined in following chapters, results from onsite measurements and evaluations yield a quantified result.

Level III: Evaluation at this level includes intensive quantitative data collection. A single practice or set of practices may be evaluated for onsite and offsite effects. The purpose of implementing the BMP may include a specific onsite control, as well as an intended offsite result. Both onsite and offsite effects would be evaluated in this level of review. An example may include evaluating reduced erosion from irrigation water management, while assessing offsite sedimentation.

¹ See *Glossary of Terms and Acronyms* for more detail on hydrologic unit codes.

Level IV: A comparative study may be performed which evaluates the BMP under different variables, for example: different soils, slopes, cropping systems, or the practice's location in the watershed. The monitoring program may combine evaluating the nutrient delivery along with other variables, e.g. algae, macroinvertebrates, and/or dissolved oxygen.

Level V: Intensive monitoring may be necessary in some instances. A research effort level of monitoring would combine practice effectiveness evaluation, onsite and offsite evaluations, and other parameters as selected. For example, a research level of monitoring may couple the evaluation of individual and groups of BMPs as well as an evaluation of a cost vs. benefit analysis, wildlife benefits, health benefits, agronomic elements, and/or chemical parameters.

Step 6: Evaluation methods are selected based on the level of BMP evaluation desired (Step 5). Evaluation methods and documentation formats are selected by the conservation planner from a wide array of choices, including standard forms (provided in this guidance manual as well as within standardized guidelines), computer models and programs, onsite measurements, and offsite measurements. Evaluation methods and documentation are found in *Evaluation References* toward the back of this document.

Step 7: Once the evaluation method and documentation is selected, a BMP effectiveness monitoring plan of work should be developed and include the following elements:

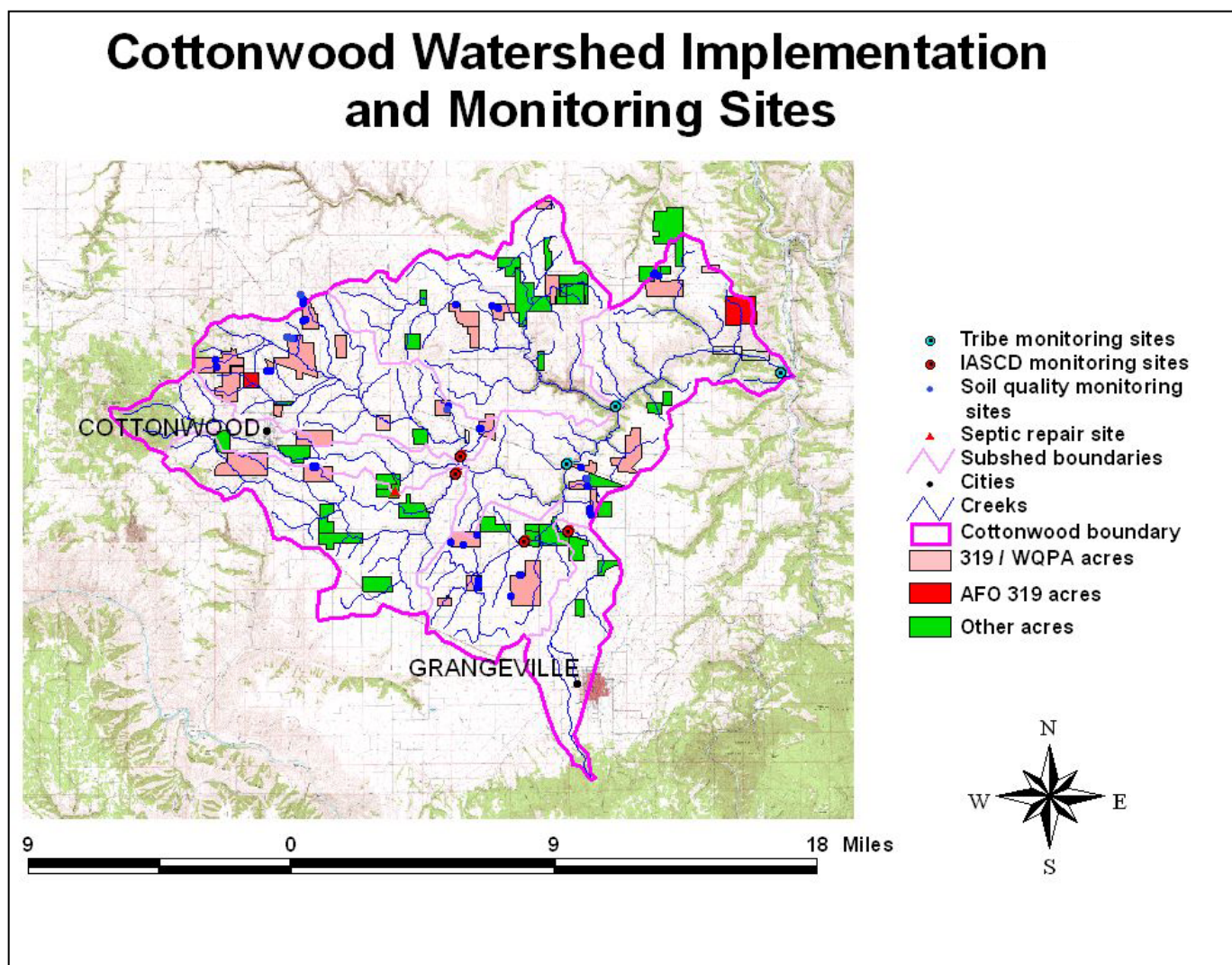
- Overall goal(s) of the BMP effectiveness monitoring
- Objectives necessary to reach the goal(s)
- Action items planned per set of objectives
- Level of BMP evaluation planned
- Identification of practices and/or systems to be evaluated
- Description of methodology
- Evaluation schedule
- System for incorporating the feedback loop process into the implementation program (see narrative below)
- Additional monitoring scheduled, needed, or on-going
- Reporting format, schedule and distribution

Step 8: Gather BMP effectiveness field data.

Step 9: The last, and often forgotten, step is documentation. This important step includes tracking the BMP effectiveness and decisions made in the evaluation process. Field data forms outline the basis for effectiveness rating and evaluation. The sequence of events in documentation includes reporting practice implementation and overall effectiveness rating on field data forms (Form I), and entering the information into the computerized tracking system referenced as the *BMP Effectiveness Evaluation Program* (referred to as the Tracker). The BMP Effectiveness Evaluation Program is developed and maintained by the SCC.

Documentation is the cornerstone for cumulative effects evaluation. Many available documentation tools can help with determining overall effectiveness, both qualitatively and quantitatively. Reported documentation is used to help close the feedback loop at the field level and watershed level. Documentation is necessary to help validate progress, redirect programs, provide progress to decision makers, facilitate technology transfer, assist with economic evaluations, and help obtain program funding.

Figure 1. Example BMP Effectiveness Monitoring Plan Map



Chapter 2 - Irrigated Cropland



AGRICULTURAL ACTIVITY AND SELECTED BMPs

The following BMPs most commonly associated with irrigated cropland activities are included in this chapter:

- Anionic Polyacrylamide Erosion Control
- Conservation Crop Rotation
- Deep Tillage
- Filter Strip
- Irrigation Land Leveling
- Irrigation System
- Irrigation Water Management
- Nutrient Management
- Pest Management
- Residue Management (direct seed, mulch till, no-till, seasonal)
- Sediment Basin

Anionic Polyacrylamide Erosion Control (PAM) (NRCS Code 450, NRCS National Handbook of Conservation Practices)

Erosion control through application of water-soluble anionic polyacrylamide.

BMP Purpose

This practice is applied as part of a conservation management system to support one or more of the following: minimize or control irrigation-induced soil erosion, and/or reduce wind and/or precipitation erosion.

Conservation Crop Rotation (NRCS Code 328, Idaho NRCS)

Growing crops in a recurring sequence on the same field.

BMP Purpose

This practice should be applied as part of a conservation management system to support one or more of the following:

- Reduce soil erosion
- Reduce irrigation-induced erosion
- Improve or maintain water quality
- Improve or maintain water infiltration
- Maintain or improve soil organic matter
- Manage deficient or excess plant nutrients
- Improve efficient use of available water
- Manage plant pests (weeds, insects, diseases)
- Provide food for domestic livestock
- Provide food and cover for wildlife
- Maintain or improve agronomic yields

Deep Tillage (NRCS Code 321, Idaho NRCS)

Tillage operations performed below the normal tillage depth to modify the physical or chemical properties of a soil.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following purposes: to fracture restrictive soil layers improving water infiltration, root penetration and aeration; to reduce runoff and soil erosion; to maintain or improve water quality; to bury or mix soil deposits from wind or water erosion of flood overwash; or to reduce concentration of soil contaminants, which inhibit plant growth or adversely affect food or feed quality.

Filter Strip (NRCS Code 393, Idaho NRCS)

A strip or area of vegetation designed to remove sediment, organic matter, and other pollutants from runoff and waste water.

BMP Purpose

- Reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff
- Reduce dissolved contaminant loadings in runoff
- Serve as Zone 3 of a Riparian Forest Buffer, Practice Standard 391
- Reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in surface irrigation tailwater
- Restore, create or enhance herbaceous habitat for wildlife and beneficial insects
- Maintain or enhance watershed functions and values

Irrigation Land Leveling (NRCS Code 464, Idaho NRCS)

Reshaping the surface of land to be irrigated to planned grades.

BMP Purpose

This practice permits uniform and efficient application of irrigation water to the leveled land.

Irrigation System, Microirrigation (NRCS Code 441, Idaho NRCS)

Used for distribution of water directly to the plant root zone by means of surface or subsurface applicators.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following purposes: to efficiently and uniformly apply irrigation water and maintain soil moisture for optimum plant growth, and to apply chemicals.

Irrigation System, Sprinkler (NRCS Code 442, Idaho NRCS)

A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.

BMP Purpose

This practice is used to efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.

Irrigation System, Surface and Subsurface (NRCS Code 443, Idaho NRCS)

A planned irrigation system in which all necessary water-control structures have been installed for the efficient distribution of irrigation water by surface means, such as furrows, borders, contour levees, or contour ditches, or by subsurface means.

BMP Purpose

This practice is designed to efficiently convey and distribute irrigation water to the point of application without causing excessive water loss, erosion, or reduced water quality.

Irrigation System, Tailwater Recovery (NRCS Code 447, NRCS National Handbook of Conservation Practices)

A planned irrigation system in which all facilities utilized for the collection, storage, and transportation of irrigation tailwater for reuse have been installed.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following: conservation irrigation water supplies; and/or improve offsite water quality.

Irrigation Water Management (NRCS Code 449, Idaho NRCS)

The process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner. The practice is applicable to all irrigated lands where an irrigation system adapted for site conditions is available and capable of applying water to meet the intended purposes.

BMP Purpose

Irrigation water management (IWM) is applied as a part of a conservation management system to support one or more of the following:

- Manage soil moisture to promote desired crop response
- Optimize use of available water supplies
- Minimize irrigation induced soil erosion
- Decrease nonpoint source pollution of surface and groundwater resources
- Manage salts in the crop root zone
- Manage air, soil, or plant micro-climate

Nutrient Management (NRCS Code 590, Idaho NRCS)

Managing the amount, source, placement, form and timing of the application of nutrients and soil amendments.

BMP Purpose

It is intended that nutrient management plans developed from this standard be used to help producers improve or maintain their level of management and expertise as it relates to the application of nutrients on the lands they own and/or control for the following:

- Budget and supply nutrients for plant production
- Minimize the potential for environmental damage including agricultural non-point source pollution of surface and ground water resources
- Maintain or improve the physical, chemical and biological condition of soil
- Properly utilize all sources of organic material, including animal waste, as a plant nutrient source
- Prevent or reduce excess nutrient concentrations in the soil

Pest Management (NRCS Code 595, Idaho NRCS)

Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals and other organisms (including invasive and noninvasive species), that directly or indirectly cause damage or annoyance.

BMP Purpose

This practice is applied as part of a resource management system to support one or more of the following:

- Enhance quantity and quality of crops grown for food and fiber
- Minimize negative impacts of pest control on soil resources, air resources, plant resources, animal resources and/or humans

Residue Management, Direct Seed (NRCS Code 777, Idaho NRCS)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round, while growing crops where the entire field surface is tilled prior to planting.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion
- Reduce wind erosion
- Maintain or improve soil organic matter content
- Improve or maintain water infiltration and conserve soil moisture
- Manage snow to increase plant available moisture or reduce plant damage from freezing or desiccation
- Provide food and escape cover for wildlife
- Reduce irrigation induced erosion

- Improve or maintain water quality
- Maintain or improve agronomic yields

Residue Management, Mulch Till (NRCS Code 329-B, Idaho NRCS)

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops where the entire field's surface is tilled prior to planting.

BMP Purpose

This practice may be applied as part of a conservation system to support one or more of the following:

- Reduce soil erosion
- Reduce wind erosion
- Reduce irrigation-induced erosion
- Improve or maintain water quality
- Improve or maintain water infiltration
- Maintain or improve soil organic matter content and tilth
- Manage snow to increase plant available moisture
- Provide food and escape cover for wildlife
- Maintain and improve agronomic yields

Residue Management, No Till and Strip Till (NRCS Code 329-A, Idaho NRCS)

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops in narrow slots, tilled or residue free strips in previously untilled by full width inversion implements.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion
- Reduce wind erosion
- Reduce irrigation-induced erosion
- Improve or maintain water quality
- Improve or maintain water infiltration and conserve soil moisture
- Maintain or improve soil organic matter content
- Manage snow to increase plant available moisture or reduce plant damage from freezing or desiccation
- Provide food and escape cover for wildlife
- Maintain or improve agronomic yields

Residue Management, Ridge Till (NRCS Code 329-C, Idaho NRCS)

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops on performed ridges alternated with furrows protected by crop residue.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- Reduce soil erosion
- Improve or maintain water quality
- Improve or maintain water infiltration
- Maintain or improve soil organic matter content and tilth
- Manage snow to increase plant available moisture
- Provide food and escape cover for wildlife
- Maintain and improve agronomic yields

Residue Management, Seasonal (NRCS Code 344, Idaho NRCS)

Manage the amount, orientation, and distribution of crop and other plant residues on the soil surface during part of the year, while growing crops in a clean tilled seedbed.

BMP Purpose

This practice may be applied as part of a conservation system to support one or more of the following:

- Reduce soil erosion
- Improve or maintain water quality
- Improve or maintain water infiltration
- Maintain or improve soil organic matter content and tilth
- Manage snow to increase plant available moisture
- Provide food and escape cover for wildlife

Sediment Basin (NRCS Code 350, Idaho NRCS)

A basin constructed to collect and store debris or sediment.

BMP Purpose

This practice may be utilized to preserve the capacity of reservoirs, ditches, canals, diversions, waterways, and streams; to prevent undesirable deposition on bottom lands and developed areas; to trap sediment originating from construction sites; and to reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

METHODS and DOCUMENTATION

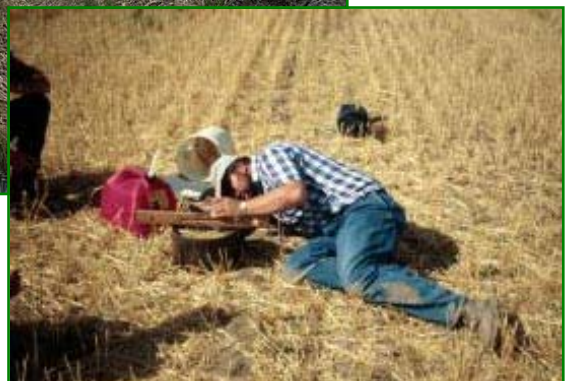
The following table offers suggested methods for performing irrigated cropland BMP effectiveness evaluation and documentation.

BMPs most commonly associated with irrigated cropland activities are listed across the top of the following table. Suggested methods and applicable documentation used to perform BMP effectiveness evaluations are listed in the left-hand vertical column. The check marks (✓) link the BMP with its corresponding evaluation methods (see Chapter 1, Steps 5 and 6).

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES | | | | | | | | | | |
|--|---------------------------|----------------------------|--------------|--------------|--------------------------|-------------------|-----------------------------|---------------------|-----------------|--------------------|----------------|
| | PAM Erosion Control | Conservation Crop Rotation | Deep Tillage | Filter Strip | Irrigation Land Leveling | Irrigation System | Irrigation Water Management | Nutrient Management | Pest Management | Residue Management | Sediment Basin |
| BMP Effectiveness Evaluation Field Sheet | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Client Interview | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Onsite Observations | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photographs | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| CPED (Center Pivot Evaluation and Design) | | | | | | ✓ | ✓ | | | | |
| EPIC (Erosion Productivity Impact Calculator) | | | | | | | | ✓ | ✓ | | |
| GLEAMS (Groundwater Loading Effects of Agricultural Mgt. System) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| GMS (Groundwater Modeling System) | | | | | | | | ✓ | | | |
| Home*A*Syst-Fertilizer Storage and Handling Worksheet | | | | | | | | ✓ | | | |
| Home*A*Syst-Pesticide Storage and Handling Worksheet | | | | | | | | | ✓ | | |
| Idaho Fertilizer Guide | | | | | | | | ✓ | | | |
| Imhoff Cone Evaluation | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES (same practices continued from previous page) | | | | | | | | | |
|--|--|----------------------------|--------------|--------------|--------------------------|-------------------|-----------------------------|---------------------|-----------------|--------------------|
| | PAM Erosion Control | Conservation Crop Rotation | Deep Tillage | Filter Strip | Irrigation Land Leveling | Irrigation System | Irrigation Water Management | Nutrient Management | Pest Management | Residue Management |
| Moisture Sensors | | | ✓ | | ✓ | ✓ | ✓ | | | |
| National Irrigation Guide | | | | | | ✓ | ✓ | | | |
| NLEAP (Nitrate Leaching and Economic Analysis Package) | | | | | | | | ✓ | | |
| Nutrient Management Standard | | | | | | | | ✓ | | |
| PHAUCET | ✓ | | | | ✓ | ✓ | ✓ | | | |
| Quality Criteria | | | | | | ✓ | ✓ | | | |
| RUSLE (Revised Universal Soil Loss Equation) | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ |
| SISL (Surface Irrigation Soil Loss Equation) | | | | | | ✓ | ✓ | | | |
| Soil Conditioning Index | | ✓ | | | | | | | | ✓ |
| Soil Tests | | | | | ✓ | ✓ | ✓ | ✓ | | |
| Soil Quality Test Kit | | ✓ | | | | | | | | ✓ |
| Structural Survey Worksheet | | | | | | | | | | ✓ |
| Water Quality Testing | ✓ | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| WinPST (Windows Pesticide Screening Tool) | | | | | | | ✓ | ✓ | | |

Chapter 3 - Nonirrigated Cropland



AGRICULTURAL ACTIVITY AND SELECTED BMPs

The following BMPs most commonly associated with nonirrigated cropland activities are included in this chapter:

- Conservation Cover
- Conservation Crop Rotation
- Contour Buffer Strips
- Contour Farming
- Deep Tillage
- Field Border
- Filter Strip
- Grade Stabilization Structure
- Grassed Waterway
- Nutrient Management
- Pest Management
- Residue Management (direct seed, mulch till, no-till)
- Sediment Basin
- Stripcropping, Field
- Terrace
- Water and Sediment Control Basin

Conservation Cover (NRCS Code 327, Idaho NRCS)

The process of establishing and maintaining permanent vegetative cover to protect soil and water resources.

BMP Purpose

This practice should be applied as part of a conservation management system to support one or more of the following:

- Reduce soil erosion
- Improve water quality
- Enhance wildlife habitat

Conservation Crop Rotation (NRCS Code 328, Idaho NRCS)

The system of growing crops in a recurring sequence on the same field.

BMP Purpose

This practice should be applied as part of a conservation management system to support one or more of the following:

- Reduce soil erosion
- Reduce irrigation-induced erosion
- Improve or maintain water quality
- Improve or maintain water infiltration
- Maintain or improve soil organic matter
- Manage deficient or excess plant nutrients
- Improve efficient use of available water

- Manage plant pests (weeds, insects, diseases)
- Provide food for domestic livestock
- Provide food and cover for wildlife
- Maintain or improve agronomic yields

Contour Buffer Strips (NRCS Code 332, Idaho NRCS)

A system of narrow strips of permanent herbaceous vegetative cover established across the slope and alternated down the slope with parallel wider crop strips.

BMP Purpose

This practice should be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion
- Reduce transport of sediment and other water-borne contaminants down slope, onsite or offsite
- Enhance wildlife habitat

Contour Farming (NRCS Code 330, Idaho NRCS)

Tillage, planting, and other farming operations performed on or near the contour of the field slope.

BMP Purpose

The practice's purpose is to reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

Deep Tillage (NRCS Code 324, Idaho NRCS)

The process of performing tillage operations below the normal tillage depth to modify the physical or chemical properties of a soil.

BMP Purpose

This practice should be applied as part of a conservation management system to support one or more of the following:

- Fracture restrictive soil layers improving water infiltration, root penetration and aeration
- Reduce runoff and soil erosion
- Maintain or improve water quality
- Bury or mix soil deposits from wind or water erosion or flood overwash
- Reduce concentration of soil contaminants, which inhibit plant growth or adversely affect food or feed quality

Field Border (NRCS Code 386, Idaho NRCS)

A strip of permanent vegetation established at the edge or around the perimeter of a field.

BMP Purpose

- Reduce erosion from wind and water
- Soil and water quality protection
- Management of harmful insect populations
- Provide wildlife food and cover

Filter Strip (NRCS Code 393, Idaho NRCS)

A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater.

BMP Purpose

- Reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff
- Reduce dissolved contaminant loadings in runoff
- Serve as Zone 3 of a Riparian Forest Buffer, Practice Standard 391
- Reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in surface irrigation tailwater
- Restore, create or enhance herbaceous habitat for wildlife and beneficial insects
- Maintain or enhance watershed functions and values

Grade Stabilization Structure (NRCS Code 410, Idaho NRCS)

A structure used to control the grade and head cutting in natural or artificial channels.

BMP Purpose

This practice should be applied as part of a conservation management system to support one or more of the following:

- Stabilize the grade
- Control erosion in natural or artificial channels
- Prevent the formation or advance of gullies
- Enhance environmental quality
- Reduce pollution hazards

Grassed Waterway (NRCS Code 412, Idaho NRCS)

A natural or constructed channel that is shaped or graded to required dimensions and established with suitable vegetation.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- Convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding
- Reduce gully erosion
- Protect/improve water quality

Nutrient Management (NRCS Code 590, Idaho NRCS)

Managing the amount, source, placement, form and timing of the application of nutrients and soil amendments.

BMP Purpose

It is intended that nutrient management plans developed from this standard be used to help producers improve or maintain their level of management and expertise as it relates to the application of nutrients on the lands they own and/or control for the following:

- Budget and supply nutrients for plant production
- Minimize the potential for environmental damage including agricultural non-point source pollution of surface and ground water resources
- Maintain or improve the physical, chemical and biological condition of soil
- Properly utilized all sources of organic material, including animal waste, as a plant nutrient source
- Prevent or reduce excess nutrient concentrations in the soil

Pest Management (NRCS Code 595, Idaho NRCS)

Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals and other organisms (including invasive and noninvasive species), that directly or indirectly cause damage or annoyance.

BMP Purpose

This practice is applied as part of a resource management system to support one or more of the following: enhance quantity and quality of crops grown for food and fiber; and/or minimize negative impacts of pest control on soil resources, air resources, plant resources, animal resources and/or humans.

Residue Management, Direct Seed (NRCS Code 777, Idaho NRCS)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round, while growing crops where the entire fields surface is tilled prior to planting.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion
- Reduce wind erosion
- Maintain or improve soil organic matter content
- Improve or maintain water infiltration and conserve soil moisture
- Manage snow to increase plant available moisture or reduce plant damage from freezing or desiccation
- Provide food and escape cover for wildlife
- Reduce irrigation induced erosion
- Improve or maintain water quality
- Maintain or improve agronomic yields

Residue Management, Mulch Till (NRCS Code 329-B, Idaho NRCS)

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round, while growing crops where the entire field's surface is tilled prior to planting.

BMP Purpose

This practice may be applied as part of a conservation system to support one or more of the following:

- Reduce soil erosion
- Reduce wind erosion
- Reduce irrigation-induced erosion
- Improve or maintain water quality
- Improve or maintain water infiltration
- Maintain or improve soil organic matter content and tilth
- Manage snow to increase plant available moisture
- Provide food and escape cover for wildlife
- Maintain and improve agronomic yields

Residue Management, No Till and Strip Till (NRCS Code 329-A, Idaho NRCS)

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops in narrow slots, tilled or residue free strips in fields previously untilled by full width inversion implements.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion
- Reduce wind erosion
- Reduce irrigation-induced erosion
- Improve or maintain water quality
- Improve or maintain water infiltration and conserve soil moisture
- Maintain or improve soil organic matter content
- Manage snow to increase plant available moisture or reduce plant damage from freezing or desiccation
- Provide food and escape cover for wildlife
- Maintain or improve agronomic yields

Residue Management, Ridge Till (NRCS Code 329-C, Idaho NRCS)

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops on performed ridges alternated with furrows protected by crop residue.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- Reduce soil erosion
- Improve or maintain water quality
- Improve or maintain water infiltration
- Maintain or improve soil organic matter content and tilth
- Manage snow to increase plant available moisture
- Provide food and escape cover for wildlife
- Maintain and improve agronomic yields

Sediment Basin (NRCS Code 350, Idaho NRCS)

A basin constructed to collect and store debris or sediment.

BMP Purpose

This practice may be utilized to preserve the capacity of reservoirs, ditches, canals, diversions, waterways, and streams; to prevent undesirable deposition on bottom lands and developed areas; to trap sediment originating from construction sites; and to reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Stripcropping, Field (NRCS Code 586, Idaho NRCS)

Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean tilled crop or fallow.

BMP Purpose

This practice may be used to help control erosion and runoff on sloping cropland where contour stripcropping is not practical.

Terrace (NRCS Code 600, Idaho NRCS, February 2000)

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

BMP Purpose

- Reduce slope length
- Reduce erosion
- Reduce sediment content in runoff water
- Improve water quality
- Intercept and conduct surface runoff at a non-erosive velocity to a stable outlet
- Retain runoff for moisture conservation
- Prevent gully development
- Reform the land surface
- Improve formability
- Reduce flooding

Water and Sediment Control Basin (NRCS Code 638, Idaho NRCS)

An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and a water detention basin.

BMP Purpose

- Improve the farmability of sloping land
- Reduce watercourse and gully erosion
- Trap sediment
- Reduce and manage onsite and downstream runoff
- Improve downstream water quality

METHODS and DOCUMENTATION

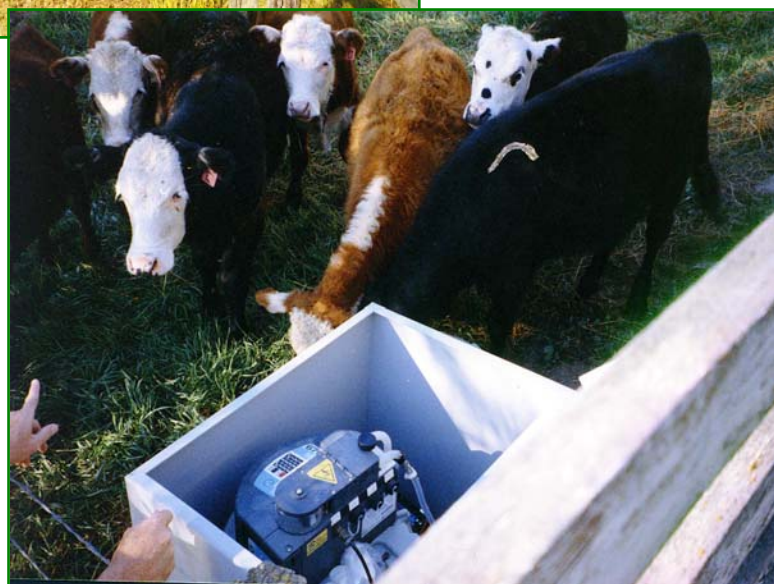
The following table offers suggested methods for performing nonirrigated cropland BMP effectiveness evaluation and documentation.

BMPs most commonly associated with **nonirrigated cropland** activities are listed across the top of the following table. Suggested methods and applicable documentation used to perform BMP effectiveness evaluations are listed in the left-hand vertical column. The check marks (✓) link the BMP with its corresponding evaluation methods (see Chapter 1, Steps 5 and 6).

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES | | | | | | | | | |
|---|---------------------------|----------------------------|-----------------------|-----------------|--------------|--------------|--------------|-------------------------------|------------------|---------------------|
| | Conservation Cover | Conservation Crop Rotation | Contour Buffer Strips | Contour Farming | Deep Tillage | Field Border | Filter Strip | Grade Stabilization Structure | Grassed Waterway | Nutrient Management |
| BMP Effectiveness Evaluation Field Sheet | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Client Interview | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Onsite Observations | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photographs | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| AGNPS (Agricultural Nonpoint Source Pollution Model) | ✓ | ✓ | | ✓ | | | | | | ✓ |
| Alutrin Method | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | |
| Gully Erosion Prediction | | | | | | | | ✓ | ✓ | |
| Home*A*Syst-Fertilizer Storage and Handling Worksheet | | | | | | | | | | ✓ |
| Idaho Fertilizer Guide | | | | | | | | | | ✓ |
| Nutrient Management Standard | | | | | | | | | | ✓ |
| Quality Criteria | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| RUSLE (Revised Universal Soil Loss Equation) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | |
| SITES (Water Resources Site Analysis Program) | ✓ | | | | | | | | | |
| Soil Conditioning Index | ✓ | ✓ | | | ✓ | | | | | |
| Soil Tests | | | | | | | | | | ✓ |
| Soil Quality Test Kit | ✓ | ✓ | | | ✓ | | | | | |
| TR-55 (NRCS Technical Release 55) | ✓ | | | | | | | | | |
| Water Quality Indicators Guide | | | | | | | ✓ | | | |
| Water Quality Testing | | | | | | | | | | ✓ |
| WEPP (Water Erosion Prediction Project) | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | |
| WEQ (Wind Erosion Equation) | ✓ | ✓ | | | | | | | | |

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES (practices continued from previous page) | | | | | |
|--|---|--------------------|----------------|----------------------|---------|-------------------------------------|
| | Pest Management | Residue Management | Sediment Basin | Stripcropping, Field | Terrace | Water and Sediment Control Basin |
| BMP Effectiveness Evaluation Field Sheet | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Client Interview | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Onsite Observations | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photographs | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| AGNPS (Agricultural Nonpoint Source Pollution Model) | | ✓ | | | | |
| Alutin Method | | | | ✓ | ✓ | |
| Gully Erosion Prediction | | | | | ✓ | ✓ |
| Home*A*Syst-Pesticide Storage and Handling Worksheet | ✓ | | | | | |
| Imhoff Cone Evaluation | | | ✓ | | | |
| Nonirrigated Cropland Quality Indicators | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Quality Criteria | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| RUSLE (Revised Universal Soil Loss Equation) | | ✓ | | ✓ | ✓ | |
| SITES (Water Resources Site Analysis Program) | | ✓ | | | | |
| Soil Conditioning Index | | ✓ | | | | |
| Soil Quality Test Kit | | ✓ | | | | |
| TR-55 (NRCS Technical Release 55) | | ✓ | | | | |
| Water Quality Indicators Guide | | | ✓ | | | |
| WEPP (Water Erosion Prediction Project) | | ✓ | | ✓ | | |
| WEQ (Wind Erosion Equation) | | ✓ | | | | |
| WinPST (Windows Pesticide Screening Tool) | ✓ | | | | | |

Chapter 4 - Grazing



AGRICULTURAL ACTIVITY AND SELECTED BMPs

The following BMPs most commonly associated with grazing activities are included in this chapter:

- Brush Management
- Critical Area Planting
- Fence
- Forage Harvest Management
- Grazing Land Mechanical Treatment
- Heavy Use Area Protection
- Nutrient Management
- Pasture and Hay Planting
- Pest Management
- Prescribed Burning
- Prescribed Grazing
- Range Planting
- Spring Development
- Watering Facility

Brush Management (NRCS Code 314, Idaho NRCS)

Removal, reduction, or manipulation of non-herbaceous plants.

BMP Purpose

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- Restore natural plant community balance
- Create the desired plant community
- Reduce competition for space, moisture, and sunlight between desired and unwanted plants
- Manage noxious woody plants
- Restore desired vegetative cover to protect soils, control erosion, reduce sediment, improve water quality and enhance stream flow
- Maintain or enhance wildlife habitat including that associated with threatened and endangered species
- Improve forage accessibility, quality and quantity for livestock
- Protect life and property from wildfire hazards
- Improve visibility and access for handling livestock

Critical Area Planting (NRCS Code 342, Idaho NRCS)

Establishing permanent vegetation on sites that have been or are expected to have high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

BMP Purpose

- Stabilize areas with existing or expected high rates of soil erosion by water
- Stabilize areas with existing or expected high rates of soil erosion by wind
- Restore degraded sites that cannot be stabilized through normal methods

Fence (NRCS Code 382, Idaho NRCS)

A constructed barrier to livestock, wildlife or people.

BMP Purpose

This practice may be applied as part of a conservation management system to facilitate the application of conservation practices that treat the soil, water, air, plant, animal and human resource concerns.

Forage Harvest Management (NRCS Code 511, Idaho NRCS)

The timely cutting and removal of forages from the field as hay, greenchop, or ensilage.

BMP Purpose

This practice should be applied as part of a conservation management system to support one or more of the following purposes:

- Optimize the economic yield of forage at the desired quality and quantity
- Promote vigorous plant regrowth
- Maintain stand life for the desired time period
- Maintain desired species composition of the stand
- Use forage plant biomass as a nutrient uptake tool
- Control insects, diseases and weeds
- Maintain and/or improve wildlife habitat

Grazing Land Mechanical Treatment (NRCS Code 548, Idaho NRCS)

Modifying physical soil and/or plant conditions with mechanical tools by treatments such as: pitting, contour furrowing, and ripping or subsoiling.

BMP Purpose

This practice should be applied as part of a resource management system to support one or more of the following purposes:

- Fracture compacted soil layers and improve soil permeability
- Reduce water runoff and increase infiltration
- Break up sod bound conditions and thatch to increase plant vigor
- Renovate and stimulate plant community for greater productivity and yield

Heavy Use Area Protection (NRCS Code 561, Idaho NRCS)

The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, by surfacing with suitable materials, and/or by installing needed structures.

BMP Purpose

This practice may be used as part of a conservation management system to support one or more of the following purposes:

- Reduce soil erosion
- Improve water quantity and quality
- Improve air quality
- Improve aesthetics
- Improve livestock health

Nutrient Management (NRCS Code 590, Idaho NRCS)

Managing the amount, source, placement, form and timing of the application of nutrients and soil amendments.

BMP Purpose

It is intended that nutrient management plans developed from this standard be used to help producers improve or maintain their level of management and expertise as it relates to the application of nutrients on the lands they own and/or control for the following:

- Budget and supply nutrients for plant production
- Minimize the potential for environmental damage including agricultural non-point source pollution of surface and ground water resources
- Maintain or improve the physical, chemical and biological condition of soil
- Properly utilize all sources of organic material, including animal waste, as a plant nutrient source
- Prevent or reduce excess nutrient concentrations in the soil

Pasture and Hay Planting (NRCS Code 512, Idaho NRCS)

Establishing native or introduced forage species.

BMP Purpose

This practice is applied as part of a conservation management system to accomplish one or more of the following purposes:

- Establish adapted and compatible species, varieties, or cultivars
- Improve or maintain livestock and/or wildlife nutrition and/or health
- Extend the length of the grazing season
- Provide emergency forage production
- Reduce soil erosion by wind and/or water
- Increase forage production
- Improve water quality by reducing sediment and nutrients in runoff
- Maintain forage quantity and quality throughout the grazing season

Pest Management (NRCS Code 595, Idaho NRCS)

Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals and other organisms (including invasive and noninvasive species), that directly or indirectly cause damage or annoyance.

BMP Purpose

This practice is applied as part of a resource management system to support one or more of the following:

- Enhance quantity and quality of crops grown for food and fiber
- Minimize negative impacts of pest control on soil resources, air resources, plant resources, animal resources and/or humans

Prescribed Burning (NRCS Code 338, Idaho NRCS)

Applying controlled fire to a predetermined area.

BMP Purpose

- Control undesirable vegetation
- Prepare sites for harvesting, planting or seeding
- Control plant disease
- Reduce wildfire hazards
- Improve wildlife habitat
- Improve plant production quantity and/or quality
- Remove slash and debris
- Enhance seed and seedling production
- Facilitate distribution of grazing and browsing animals
- Restore and maintain ecological sites

Prescribed Grazing (NRCS Code 528A, Idaho NRCS)

The controlled harvest of vegetation with grazing or browsing animals, managed with the intent to achieve a specified objective.

BMP Purpose

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- Reduce accelerated soil erosion and maintain or improve soil condition for sustainability of the resource
- Maintain or improve water quality and quantity
- Provide or maintain food, cover and shelter for animals of concern
- Improve or maintain animal health and productivity
- Improve or maintain the health and vigor of selected plant(s) and to maintain a stable and desired plant community
- Attain grazing and management efficiency to promote economic stability

Range Planting (NRCS Code 550, Idaho NRCS)

Establishment of adapted perennial vegetation such as grasses, forbs, legumes, shrubs, and trees.

BMP Purpose

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- Restore a plant community similar to its historic climax or the desired plant community
- Provide or improve forages for livestock
- Provide or improve forage, browse or cover for wildlife
- Reduce erosion by wind and/or water
- Improve water quality and quantity
- Enhance aesthetics

Spring Development (NRCS Code 574, Idaho NRCS)

Utilizing springs and seeps to provide water for a conservation need.

BMP Purpose

This practice may be applied as part of a resource management system to support one or more of the following purposes:

- Improve the distribution of water
- Increase the quantity and quality of water for livestock, wildlife, or other uses
- Obtain water for irrigation if water is available in a suitable quantity and quality

Watering Facility (NRCS Code 614, Idaho NRCS)

A device (tank, trough, or other watertight container) for providing animal access to water.

BMP Purpose

This practice provides watering facilities for livestock and/or wildlife at selected locations in order to:

- Protect and enhance vegetative cover through proper distribution of grazing
- Provide erosion control through better grassland management
- Protect streams, ponds and water supplies from contamination by providing alternative access to water

METHODS and DOCUMENTATION

The following table offers suggested methods for performing grazing BMP effectiveness evaluation and documentation.

BMPs most commonly associated with grazing activities are listed across the top of the following table. Suggested methods and applicable documentation used to perform BMP effectiveness evaluations are listed in the left-hand vertical column. The check marks (✓) link the BMP with its corresponding evaluation methods (see Chapter 1, Steps 5 and 6).

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES | | | | | | | | |
|---|---------------------------|------------------------|-------|---------------------------|-----------------------------------|---------------------------|---------------------|--------------------------|-----------------|
| | Brush Management | Critical Area Planting | Fence | Forage Harvest Management | Grazing Land Mechanical Treatment | Heavy Use Area Protection | Nutrient Management | Pasture and Hay Planting | Pest Management |
| BMP Effectiveness Evaluation Field Sheet | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Client Interview | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Onsite Observations | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photographs | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Idaho Fertilizer Guide | | | | ✓ | | | ✓ | | |
| Nutrient Management Standard | | | | | | | ✓ | | |
| Pasture Condition Score Sheet | | ✓ | ✓ | ✓ | | | | ✓ | |
| Phosphorus Index | | | | | | | ✓ | | |
| Quality Criteria | | | | ✓ | | | ✓ | ✓ | ✓ |
| Range and Pasture Handbook | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| RUSLE | | ✓ | | | | | | ✓ | |
| Soil Conditioning Index | | | | ✓ | | | | | |
| Soil Tests | | | | | | | ✓ | | |
| Soil quality Test Kit | | | | ✓ | | | | | |
| VegSpec (Vegetation Specifications) | | ✓ | | | | | | | |
| WinPST (Windows Pesticide Screening Tool) | | | | | | | | | ✓ |

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES (practices continued from previous page) | | | | |
|--|---|-----------------------|-------------------|-----------------------|----------------------|
| | Prescribed Burning | Prescribed Grazing | Range Planting | Spring Development | Watering Facility |
| BMP Effectiveness Evaluation Field Sheet | ✓ | ✓ | ✓ | ✓ | ✓ |
| Client Interview | ✓ | ✓ | ✓ | ✓ | ✓ |
| Onsite Observations | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photographs | ✓ | ✓ | ✓ | ✓ | ✓ |
| Pasture Condition Score Sheet | ✓ | ✓ | ✓ | | |
| Quality Criteria | | ✓ | | | |
| Range and Pasture Handbook | ✓ | ✓ | ✓ | | |
| RUSLE | | ✓ | ✓ | | |
| Soil Conditioning Index | | ✓ | | | |
| Soil Quality Test Kit | | ✓ | | | |
| VegSpec | | | ✓ | | |

Chapter 5 - Waste Management Systems



LAND USE AND SELECTED BMPs

The following BMPs most commonly associated with animal waste management systems are included in this chapter:

- Constructed Wetland
- Cover Crop
- Dike
- Diversion
- Fence
- Heavy Use Area Protection
- Manure Transfer
- Nutrient Management
- Roof Runoff Structure
- Waste Management System
- Waste Storage Facility
- Waste Treatment Lagoon
- Waste Utilization
- Watering Facility

Constructed Wetland (NRCS Code 656, Idaho NRCS)

A wetland that has been constructed for the primary purpose of water quality improvement.

BMP Purpose

This practice is applied to treat wastewaters through the biological and mechanical activities of a constructed wetland.

Cover Crop (NRCS Code 340, Idaho NRCS)

Grasses, legumes, forbs, or other herbaceous plants established for seasonal cover and conservation purposes.

BMP Purpose

The principle purpose of this practice is to provide seasonal protection to erosive sites using annually seeded species adapted to the site in order to:

- Reduce erosion from wind and water
- Increase soil organic matter
- Manage excess nutrients in the soil profile
- Promote biological nitrogen fixation
- Increase biodiversity
- Suppress weeds
- Provide supplemental forage
- Manage soil moisture

Dike (NRCS Code 356, Idaho NRCS)

An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.

BMP Purpose

This practice permits improvement of agricultural land by preventing overflow and encouraging better use of drainage facilities, preventing damage to land and property, and facilitating water storage and control in connection with wildlife and other developments. Dikes can also be used to protect natural areas, scenic features and archeological sites from damage.

Diversion (NRCS Code 362, Idaho NRCS)

A channel constructed across the slope generally with a supporting ridge on the lower side.

BMP Purpose

This practice may be used as part of a resource management system to support one or more of the following purposes:

- Break up concentrations of water on long slopes, on undulating land surfaces, and on land that is generally considered too flat or irregular for terracing
- Divert water away from farmsteads, agricultural waste systems, and other improvements
- Collect or direct water for water-spreading or water-harvesting systems
- Increase or decrease the drainage area above ponds
- Protect terrace systems by diverting water from the top terrace where topography, land use, or land ownership prevents terracing the land above
- Intercept surface and shallow subsurface flow
- Reduce runoff damages from upland runoff
- Reduce erosion and runoff on urban or developing areas and at construction or mining sites
- Divert water away from active gullies or critically eroding areas
- Supplement water management on conservation cropping or stripcropping systems

Fence (NRCS Code 382, Idaho NRCS)

A constructed barrier to livestock, wildlife or people.

BMP Purpose

This practice may be applied as part of a conservation management system to facilitate the application of conservation practices that treat the soil, water, air, plant, animal and human resource concerns.

Heavy Use Area Protection (NRCS Code 561, Idaho NRCS)

The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, by surfacing with suitable materials, and/or by installing needed structures.

BMP Purpose

This practice may be used as part of a conservation management system to support one or more of the following purposes:

- Reduce soil erosion
- Improve water quantity and quality
- Improve air quality
- Improve aesthetics
- Improve livestock health

Manure Transfer (NRCS Code 634, Idaho NRCS)

A manure conveyance system using structures, conduits, or equipment.

BMP Purpose

This practice may be used to transfer animal manure (bedding material, spilled feed, process and wash water, and other residues associated with animal production may be included) through a hopper or reception pit, a pump (if applicable), and a conduit to a manure storage/treatment facility. The manure storage/treatment facility includes a loading area and agricultural land for final utilization.

Nutrient Management (NRCS Code 590, Idaho NRCS)

Managing the amount, source, placement, form and timing of the application of nutrients and soil amendments.

BMP Purpose

It is intended that nutrient management plans developed from this standard be used to help producers improve or maintain their level of management and expertise as it relates to the application of nutrients on the lands they own and/or control for the following:

- Budget and supply nutrients for plant production
- Minimize the potential for environmental damage including agricultural non-point source pollution of surface and ground water resources
- Maintain or improve the physical, chemical and biological condition of soil
- Properly utilize all sources of organic material, including animal waste, as a plant nutrient source
- Prevent or reduce excess nutrient concentrations in the soil

Roof Runoff Structure (NRCS Code 558, NHCP)

Structures that collect, control, and transport precipitation from roofs.

BMP Purpose

This practice may be applied as a part of a resource management system to support one or more of the following purposes:

- Improve water quality
- Reduce soil erosion

- Increase infiltration
- Protect structures
- Increase water quantity

Waste Management System (NRCS Code 312, Idaho NRCS)

A system of the necessary component conservation practices to manage a waste product and protect the resource base in a nonpolluting manner.

BMP Purpose

This practice is applied as part of a resource management system to support the following:

- Manage waste in a manner that prevents or minimizes degradation of air, soil, animal, plant and water resources
- Protects public health and safety

Waste Storage Facility (NRCS Code 313, Idaho NRCS)

A waste storage impoundment made by constructing an embankment and/or excavating a pit or dugout, or by fabricating a structure.

BMP Purpose

This practice is used to temporarily store wastes such as manure, wastewater, and contaminated runoff as a storage function component of an agricultural waste management system.

Waste Treatment Lagoon (NRCS Code 359, Idaho NRCS)

A waste treatment impoundment made by constructing an embankment and/or excavating a pit or dugout.

BMP Purpose

This practice may be used to biologically treat waste, such as manure and wastewater, and thereby reduce pollution potential by serving as a treatment component of a waste management system.

Waste Utilization (NRCS Code 633, Idaho NRCS)

Using agricultural wastes such as manure and wastewater or other organic residues.

BMP Purpose

- Protect water quality
- Provide fertility for crop, forage, fiber production and forest products
- Improve or maintain soil structure
- Provide feedstock for livestock
- Provide a source of energy

Watering Facility (NRCS Code 614, Idaho NRCS)

A device (tank, trough, or other watertight container) for providing animal access to water.

BMP Purpose

This practice provides watering facilities for livestock and/or wildlife at selected locations in order to:

- Protect and enhance vegetative cover through proper distribution of grazing
- Provide erosion control through better grassland management
- Protect streams, ponds and water supplies from contamination by providing alternative access to water

METHODS and DOCUMENTATION

The following table offers suggested methods for performing waste management system BMP effectiveness evaluation and documentation.

BMPs most commonly associated with **animal waste management systems** are listed across the top of the following table. Suggested methods and applicable documentation used to perform BMP effectiveness evaluations are listed in the left-hand vertical column. The check marks (✓) link the BMP with its corresponding evaluation methods (see Chapter 1, Steps 5 and 6).

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES | | | | | | | | | | | | | |
|--|---------------------------|------------|------|-----------|-------|---------------------------|-----------------|---------------------|-----------------------|-------------------------|------------------------|------------------------|-------------------|-------------------|
| | Constructed Wetland | Cover Crop | Dike | Diversion | Fence | Heavy Use Area Protection | Manure Transfer | Nutrient Management | Roof Runoff Structure | Waste Management System | Waste Storage Facility | Waste Treatment Lagoon | Waste Utilization | Watering Facility |
| BMP Effectiveness Evaluation Field Sheet | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Client Interview | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Onsite Observations | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photographs | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| AFOPro (Animal Feeding Operation Professional) | | | | | | | ✓ | ✓ | | ✓ | ✓ | | ✓ | |
| AWM (Animal Waste Management) | | | | | | | ✓ | ✓ | | ✓ | ✓ | | ✓ | |
| Home*A*Syst-Animal Lot Management Worksheet | | | | | | | ✓ | ✓ | | ✓ | ✓ | | ✓ | |
| IDAWM (Idaho Animal Waste Management program) | | | | | | | ✓ | ✓ | | ✓ | ✓ | | ✓ | |
| Nutrient Management Standard | | | | | | | | ✓ | | | | | | |
| Phosphorus Index | | | | | | | | ✓ | | | | | | |
| Quality Criteria | | | | | | | ✓ | ✓ | | ✓ | ✓ | | | |
| Site Assessment For Cattle Operations | | ✓ | | | | | | ✓ | | ✓ | ✓ | | ✓ | |
| Waste Management Field Handbook | | | | | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| Water Quality Indicators Guide | | | | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | | |
| Water Quality Testing | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |

Chapter 6 - Riparian and Wetland



LAND USE AND SELECTED BMPs

The following BMPs most commonly associated with riparian and wetland management from agricultural activity impacts are included in this chapter:

- Channel Stabilization
- Channel Vegetation
- Constructed Wetland
- Critical Area Planting
- Fence
- Filter Strip
- Heavy Use Area Protection
- Prescribed Grazing
- Riparian Forest Buffer
- Stream Habitat Improvement/Management
- Streambank and Shoreline Protection
- Tree/Shrub Establishment
- Use Exclusion
- Watering Facility
- Wetland Restoration
- Wetland Wildlife Habitat Management

Channel Stabilization (NRCS Code 584, Idaho NRCS)

Stabilizing the channel of a stream with suitable structures.

BMP Purpose

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- Maintain or alter channel bed elevation or gradient
- Modify sediment transport or deposition
- Manage surface water and ground water levels in floodplains, riparian areas, and wetlands

Channel Vegetation (NRCS Code 322, Idaho NRCS)

The process of establishing and maintaining adequate plant densities on channel banks, berms, spoil, and associated areas.

BMP Purpose

This practice should be applied as part of a conservation management system to support one or more of the following purposes:

- Stabilize channel banks and adjacent areas and reduce erosion and sedimentation using vegetation
- Maintain or enhance the quality of the environment, including visual aspects
- Enhance fish and wildlife habitat

Constructed Wetland (NRCS Code 656, Idaho NRCS)

A wetland that has been constructed for the primary purpose of water quality improvement.

BMP Purpose

This practice is applied to treat wastewaters through the biological and mechanical activities of a constructed wetland.

Critical Area Planting (NRCS Code 342, Idaho NRCS)

Establishing permanent vegetation on sites that have or are expected to have high soil erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

BMP Purpose

- Stabilize areas with existing or expected high rates of soil erosion by water
- Stabilize areas with existing or expected high rates of soil erosion by wind
- Restore degraded sites that cannot be stabilized through normal methods

Fence (NRCS Code 382, Idaho NRCS)

A constructed barrier to livestock, wildlife or people.

BMP Purpose

This practice may be applied as part of a conservation management system to facilitate the application of conservation practices that treat the soil, water, air, plant, animal and human resource concerns.

Filter Strip (NRCS Code 393, Idaho NRCS)

A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater.

BMP Purpose

- Reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff
- Reduce dissolved contaminant loadings in runoff
- Serve as Zone 3 of a Riparian Forest Buffer, Practice Standard 391
- Reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in surface irrigation tailwater
- Restore, create or enhance herbaceous habitat for wildlife and beneficial insects
- Maintain or enhance watershed functions and values

Heavy Use Area Protection (NRCS Code 561, Idaho NRCS)

The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, by surfacing with suitable materials, and/or by installing needed structures.

BMP Purpose

This practice may be used as part of a conservation management system to support one or more of the following purposes:

- Reduce soil erosion
- Improve water quantity and quality
- Improve air quality
- Improve aesthetics
- Improve livestock health

Prescribed Grazing (NRCS Code 528A, Idaho NRCS)

The controlled harvest of vegetation with grazing or browsing animals, managed with the intent to achieve a specified objective.

BMP Purpose

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- Reduce accelerated soil erosion and maintain or improve soil condition for sustainability of the resource
- Maintain or improve water quality and quantity
- Provide or maintain food, cover and shelter for animals of concern
- Improve or maintain animal health and productivity
- Improve or maintain the health and vigor of selected plant(s) and to maintain a stable and desired plant community
- Attain grazing and management efficiency to promote economic stability

Riparian Forest Buffer (NRCS Code 391, Idaho NRCS)

An area of predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies.

BMP Purpose

- Create shade to lower water temperatures
- Provide a source of detritus and large woody debris for aquatic and terrestrial organisms
- Create wildlife habitat and establish wildlife corridors
- Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow
- Produce a timber, fiber, forage, fruit, or other crop consistent with other intended purposes

- Provide protection against scour erosion within the floodplain
- Restore natural riparian plant communities
- Moderate winter temperatures to reduce freezing of aquatic over-wintering habitats
- Increase carbon storage

Stream Habitat Improvement and Management (NRCS Code 395, Idaho NRCS)

Treatment(s) used to maintain, improve, or restore physical, chemical and biological functions of a stream.

BMP Purpose

- Provide suitable habitat for desired aquatic species and diverse aquatic communities
- Provide channel morphology and associated riparian characteristics important to desired aquatic species
- Provide aesthetic values and recreation opportunities associated with stream habitats such as angling and fish and wildlife viewing

Streambank and Shoreline Protection (NRCS Code 580, Idaho NRCS)

Treatment(s) used to stabilize and protect banks of streams or constructed channels, and shorelines of lakes, reservoirs, or estuaries.

BMP Purpose

- Prevent the loss of land or damage to land uses, or other facilities adjacent to the banks, including the protection of known historical, archeological, and traditional cultural properties
- Maintain the flow or storage capacity of the water body or to reduce the offsite or downstream effects of sediment resulting from bank erosion
- Improve or enhance the stream corridor for fish and wildlife habitat, aesthetics, recreation

Tree/Shrub Establishment (NRCS Code 342, Idaho NRCS)

Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

BMP Purpose

Establishing woody plants, this practice can provide forest products, wildlife habitat, long-term erosion control and improvement of water quality, waste treatment, reduction of air pollution, sequestration of carbon, energy conservation, and aesthetic enhancements.

Use Exclusion (NRCS Code 472, Idaho NRCS)

Excluding animals, people or vehicles from an area.

BMP Purpose

This practice is used to prevent, restrict, or control access to an area to maintain or improve the quantity and quality of natural resources or minimize liability and human health concerns.

Watering Facility (NRCS Code 614, Idaho NRCS)

A device (tank, trough, or other watertight container) for providing animal access to water.

BMP Purpose

This practice may be used to provide watering facilities for livestock and/or wildlife at selected locations in order to:

- Protect and enhance vegetative cover through proper distribution of grazing
- Provide erosion control through better grassland management
- Protect streams, ponds and water supplies from contamination by providing alternative access to water

Wetland Restoration (NRCS Code 657, Idaho NRCS)

A rehabilitation of a drained or degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to the natural condition to the extent practicable.

BMP Purpose

This practice is used to restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions that occurred on the disturbed wetland site prior to modification to the extent practicable.

Wetland Wildlife Habitat Management (NRCS Code 644, Idaho NRCS)

Retaining, developing, or managing habitat for wetland wildlife.

BMP Purpose

This practice may be utilized to maintain, develop, or improve habitat for waterfowl, fur-bearers, or other wetland associated flora and fauna.

METHODS and DOCUMENTATION

The following table offers suggested methods for performing riparian and wetland BMP effectiveness evaluation and documentation.

BMPs most commonly associated with the management of **riparian and wetland areas** are listed across the top of the following table. Suggested methods and applicable documentation used to perform BMP effectiveness evaluations are listed in the left-hand vertical column. The check marks (✓) link the BMP with its corresponding evaluation methods (see Chapter 1, Steps 5 and 6).

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES | | | | | | | |
|--|---------------------------|--------------------|---------------------|------------------------|-------|--------------|---------------------------|--------------------|
| | Channel Stabilization | Channel Vegetation | Constructed Wetland | Critical Area Planting | Fence | Filter Strip | Heavy Use Area Protection | Prescribed Grazing |
| BMP Effectiveness Evaluation Field Sheet | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Client Interview | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Onsite Observations | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photographs | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank Stability and Toe Erosion Model | ✓ | ✓ | | | | | | |
| Idaho River Ecological Assessment Framework | ✓ | ✓ | | ✓ | | | | |
| Idaho Small Stream Ecological Assessment Framework | ✓ | ✓ | | ✓ | | | | |
| PFC (Proper Functioning Condition) | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Protocol #8 | ✓ | ✓ | | | | | | |
| SVAP (Stream Visual Assessment Protocol) | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| VegSpec (Vegetation Specifications) | | ✓ | ✓ | ✓ | | ✓ | | |
| Water Quality Assessment Guide | | ✓ | | ✓ | ✓ | ✓ | | ✓ |
| Water Quality Indicators Guide | | ✓ | ✓ | ✓ | | | | ✓ |
| Water Quality Testing | | | | | ✓ | ✓ | ✓ | ✓ |
| Wildlife Quality | | ✓ | ✓ | ✓ | | | | |

| Evaluation Methods and Documentation | BEST MANAGEMENT PRACTICES (practices continued from previous page) | | | | | | | |
|--|---|--|-------------------------------------|--------------------------|---------------|-------------------|---------------------|-------------------------------------|
| | Riparian Forest Buffer | Stream Habitat Improvement/ Management | Streambank and Shoreline Protection | Tree/Shrub Establishment | Use Exclusion | Watering Facility | Wetland Restoration | Wetland Wildlife Habitat Management |
| BMP Effectiveness Evaluation Field Sheet | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Client Interview | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Onsite Observations | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Photographs | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bank Stability and Toe Erosion Model | ✓ | ✓ | ✓ | ✓ | | | | |
| Idaho River Ecological Assessment Framework | | ✓ | ✓ | ✓ | | | | ✓ |
| Idaho Small Stream Ecological Assessment Framework | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| PFC (Proper Functioning Condition) | ✓ | ✓ | ✓ | ✓ | | | | |
| Protocol #8 | ✓ | ✓ | ✓ | ✓ | | | | |
| SVAP (Stream Visual Assessment Protocol) | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| VegSpec (Vegetation Specifications) | ✓ | | | ✓ | | | ✓ | ✓ |
| Water Quality Assessment Guide | | ✓ | ✓ | | | | ✓ | |
| Water Quality Indicators Guide | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Water Quality Testing | ✓ | | ✓ | | | | ✓ | |
| Wildlife Quality | | ✓ | | ✓ | | ✓ | | ✓ |

Evaluation References



DOCUMENTATION

An imperative component of tracking BMP effectiveness and decisions made in the evaluation process is documentation. Documentation of selected evaluation methods are chosen by the conservation planner from a wide array of choices, including standard forms (provided in this guidance manual as well as within standardized published guidelines), computer models and programs, onsite and offsite measurements.

BMP evaluation may occur at several different levels determined by a variety of circumstances. Evaluation methods may be useful at one or several different levels. As discussed in *Initializing BMP Effectiveness Evaluation*, Step 5 (Page 1-2), because BMPs may be evaluated at many different levels, it is important to determine the level of evaluation before the formal monitoring plan is developed and evaluation methods and documentation are selected. BMP effectiveness evaluation can be grouped into five levels:

- | | |
|-------------------|---|
| Level I: | This important, but basic, level of evaluation simply insures that the practice is in place, it works, and it is being maintained. This level is referred to as a qualitative evaluation and may include a combination of tasks, including seasonal or annual site visits and documentation, photo documentation, and an evaluation report qualifying that the practice is meeting the original intended use. |
| Level II: | BMP effectiveness may be evaluated quantitatively. The review of whether the practice is meeting the original intended use (purpose) may be evaluated by a set of measurements. Using the tools defined in following chapters, results from onsite measurements and evaluations yield a quantified result. |
| Level III: | Evaluation at this level includes intensive quantitative data collection. A single practice or set of practices may be evaluated for onsite and offsite effects. The purpose of implementing the BMP may include a specific onsite control, as well as an intended offsite result. Both onsite and offsite effects would be evaluated in this level of review. An example may include evaluating reduced erosion from irrigation water management, while assessing offsite sedimentation. |
| Level IV: | A comparative study may be performed which evaluates the BMP under different variables, for example; different soils, slopes, cropping systems, or the practice's position in the watershed. The monitoring program may combine evaluating the nutrient delivery along with other variables, e.g. algae, macroinvertebrates, dissolved oxygen for example. |
| Level V: | Intensive monitoring may be necessary in some instances. A research effort level of monitoring would combine practice effectiveness evaluation, onsite and offsite evaluations, and other parameters as selected. For example, a research level of monitoring may couple the evaluation of individual and groups of BMPs as well as an evaluation of a cost vs. benefit analysis, wildlife benefits, health benefits, agronomic elements, chemical parameters, etc. |

The following table illustrates the referenced evaluation methods and the applicable level of assessment.

Evaluation References

| Evaluation References (Evaluation Reference Description Follows) | Applicable Level of BMP Assessment (See Step 5, Page 1-2) |
|--|---|
| AFOPro (Animal Feeding Operation Professional) | II |
| AGNPS (Agricultural Nonpoint Source Pollution Model) | III |
| Alutin Method | II |
| AWM (Animal Waste Management) | II |
| Bank Stability and Toe Erosion Model | IV |
| BMP Effectiveness Evaluation Field Sheet | I-V |
| CPED (Center Pivot Evaluation and Design) | IV-V |
| Client Interview | I-IV |
| CONCEPTS (Conservation Channel Evolution & Pollutant Transport System) | V |
| EPIC (Erosion Productivity Impact Calculator) | IV |
| GLEAMS (Groundwater Loading Effects of Agricultural Management System) | IV |
| GMS (Groundwater Modeling System) | III |
| Gully Erosion Prediction | I-II |
| Home*A*Syst-Animal Lot Management Worksheet | I |
| Home*A*Syst-Pesticide Storage and Handling Worksheet | I |
| IDAWM (Idaho Animal Waste Management) | II |
| Idaho Fertilizer Guide | II-IV |
| Idaho One Plan | II |
| Idaho River Ecological Assessment Framework | III |
| Idaho Small Stream Ecological Assessment Framework | III |
| Imhoff Cone Evaluation | II |
| Indicators of Rangeland Health | II |
| Manure Master Decision Support System | II |
| Moisture Sensors | II |
| National Irrigation Guide | II-IV |
| NLEAP (Nitrate Leaching and Economic Analysis Package) | II |
| Nutrient Management Standard | III |
| Onsite Observation | I-III |
| Pasture Condition Score Sheet | II |
| PHAUCET | II |
| Photographs | I-IV |
| PFC (Proper Functioning Condition) | III |
| Phosphorus Index | II |
| Protocol #8 | III |
| Quality Criteria | II |
| Range and Pasture Handbook | II |
| RUSLE (Revised Universal Soil Loss Equation) | II-III |
| SISL (Surface Irrigation Soil Loss Equation) | II |
| Site Assessment AFO/CAFO | I-II |
| SITES (Water Resource Site Analysis Program) | III |
| Soil Conditioning Index | II-IV |
| Soil Tests | II |
| Soil Quality Test Kit | II-III |
| SVAP (Stream Visual Assessment Protocol) | II |
| TR-55 (NRCS Technical Release 55) | III |
| VegSpec (Vegetation Specifications) | II-IV |
| Waste Management Field Handbook | I-II |
| Water Quality Assessment Guide | III |
| Water Quality Indicators Guide | II-III |
| Water Quality Testing | II-V |
| WEPP (Water Erosion Prediction Project) | III-IV |
| WEQ (Wind Erosion Equation) | II-III |
| WinPST (Windows Pesticide Screening Tool) | II |
| Wildlife Quality | II-III |

EVALUATION REFERENCES

[AFOPro] Animal Feeding Operation Professional is a nutrient planning tool and application that automates manure allocation decisions in compliance with the NRCS's 590 Standard, which requires the documentation of form, source, timing, method, and placement of nutrients. Additional information and software downloads are available at the hosting website:

http://www.esri.sc.edu/Projects/usda/application_development/afopro.asp.

[AGNPS] Agricultural Nonpoint Source Pollution Model. A joint ARS and NRCS system of computer models developed to predict nonpoint source pollutant loadings within agricultural watersheds. It contains a continuous simulation, surface runoff model designed to assist with determining BMPs, the setting of TMDLs, and for risk & cost/benefit analyses. AGNPS has recently been upgraded and modified into a continuous simulation watershed-scale program referred to as AnnAGNPS, or Annualized Agricultural Nonpoint Source Pollutant Loading Model, version 3.2. Additional information and software downloads are available at the hosting website:

<http://msa.ars.usda.gov/ms/oxford/nsi/agnps/Model.html>. Additional information can be found at the ARS National Sedimentation Laboratory website at: <http://www.sedlab.olemiss.edu/models.html>.

[Alutin Method] Field Measurement of Rill Erosion (Alutin Method). Worksheet found in NRCS Engineering Field Manual. Section IV of the Field Office Technical Guide (FTOG) includes Practice Standards, Practice Construction Specifications, Operation and Maintenance Worksheets, Practice Checklists and Idaho Project Agreement Worksheets. These can be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at:

<http://www.nrcs.usda.gov/technical/efotg/>.

[AWM] Animal Waste Management is a planning/design tool for animal feeding operations that can be used to estimate the production of manure, bedding, process water and determine the size of storage/treatment facilities. The procedures and calculations used in AWM are based on the USDA-NRCS Agricultural Waste Management Field Handbook, Notice No. 17, July 2003. A complete program description and software download is available at the NRCS website found at:

<http://www.wcc.nrcs.usda.gov/awm/awm.html>.

[Bank Stability and Toe Erosion Model] Channel and Watershed Processes—Bank Stability and Toe Erosion Model. Developed by the ARS and NRCS National Sedimentation Laboratory. A computer program used to assess the stability of existing channel banks and predict the effect that changes in riparian land use will have. More information and software downloads can be found at the ARS National Sedimentation Laboratory website at: <http://www.sedlab.olemiss.edu/models.html>.

[BMP Effectiveness Evaluation Field Sheet] Form developed by SCC, found in Standard Forms section of this document; **Standard Form I**. Form I should be used with every BMP effectiveness evaluation. Information from Form I is entered into a computer program (BMP Effectiveness Evaluation Program, referred to as the "Tracker"), developed and managed by SCC. The Tracker is an access database distributed by SCC/IASCD and is a requirement of their employees who are evaluating BMP effectiveness. The Tracker was first released in the Spring of 2002 and provides reporting flexibility in that BMP evaluation reports can be queried by a series of categories; such as HUC, program, project, stream reach, and individual cooperator.

[CPED] Center Pivot Evaluation and Design is a *Windows* based program for assessment of center pivot performance. The program simulates the water distribution under a center pivot from various commercial nozzles as well as performs an evaluation from catch can data. The program can be downloaded from the NRCS website for Irrigation - Water Management Models at:

<http://www.wcc.nrcs.usda.gov/nrcsirrig/irrig-mgt-models.html>.

[Client Interview] Follow up conversations and interviews with landowners, land managers and operators who implement best management practices are often one of the best sources of practices effectiveness documentation. Conversations should be documented and stored in the cooperator's file, including information such as the technical merit of the practice, the acceptability of the practice to the cooperator's operation, and the cost-benefit observations or calculations. Reviewer may choose to record information on Standard Form II.

[CONCEPTS] Conservation Channel Evolution and Pollutant Transport System. Developed by the ARS and NRCS National Sedimentation Laboratory. A computer model used to simulate the evolution of incised streams and to evaluate the long-term impact of rehabilitation measures to stabilize stream systems and reduce sediment yield. More information and software downloads can be found at the ARS National Sedimentation Laboratory website at:
<http://www.sedlab.olemiss.edu/models.html>.

[EPIC] Erosion Productivity Impact Calculator is a computer program that can be used to estimate the quantity of inputs in excess of crop requirements, which may be available for water contamination. The program is based on crop type, management practices and the daily uptake of nutrients over the growing season. More information can be found at hosting website:
<http://www.brc.tamus.edu/epic/introduction/index.html>.

[GLEAMS] Groundwater Loading Effects of Agricultural Management System is a computer program used to simulate water quality events on an agricultural field. The program can be used to evaluate the hydrologic and water quality response of many different scenarios considering different cropping systems, wetland conditions, subsurface drained fields, agricultural and municipal waste application, nutrient and pesticide applications, and different tillage systems. More information can be found at hosting website:
http://www.cpes.peachnet.edu/sewrl/Gleams/gleams_y2k_update.htm.

[GMS] Groundwater Modeling System, designed by the Engineering Computer Graphics Laboratory of Brigham Young University in cooperation with the US Army Corps of Engineers is a computer program used to perform an analysis of the transport of nitrates from the nonpoint sources of nitrates to the locations of the potential users of the groundwater. Additional information can be found on several hosting websites, including: <http://gms.watermodeling.org/>.

[Gully Erosion Prediction] Measuring and Estimating Concentrated Flow and Ephemeral Gully Erosion on Cropland. NRCS Engineering Tech Note Number 31, April 1989. More information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) (<http://www.nrcs.usda.gov/technical/efotg/>).

[Home*A*Syst–Animal Lot Management Worksheet] Idaho Homestead Assessment System information materials and worksheet used to determine if livestock feeding and confinement areas are managed properly to minimize risk of ground water contamination. Additional information can be obtained from a regional NRCS field office, or electronically from the NRCS Conservation Partners website at: http://www.nrcs.usda.gov/programs/cons_ptnrs/partnerships.html.

[Home*A*Syst–Fertilizer Storage and Handling Worksheet] Idaho Homestead Assessment System information materials and worksheet used to evaluate if commercial fertilizers are stored, handled, and disposed of properly to minimize risk of accidental spill or leakage. Additional information can be obtained from a regional NRCS field office, or electronically from the NRCS Conservation Partners website at: http://www.nrcs.usda.gov/programs/cons_ptnrs/partnerships.html.

[Home*A*Syst–Pesticide Storage and Handling Worksheet] Idaho Homestead Assessment System information materials and worksheet used to evaluate if pesticides are stored, handled, and

disposed of properly to minimize risk of accidental spill or leakage. Additional information can be obtained from a regional NRCS field office, or electronically from the NRCS Conservation Partners website at: http://www.nrcs.usda.gov/programs/cons_ptnrs/partnerships.html.

[IDAWM] Idaho Animal Waste Management program. Idaho Waste Management Guidelines for confined Feeding Operations, used to evaluate sizing requirements. For more information and software downloads, see the NRCS Idaho Engineering Programs website at: <http://www.id.nrcs.usda.gov/technical/engineering/engdwild.html>.

[Idaho Fertilizer Guide] University of Idaho Fertilizer Guides. Developed by the University of Idaho Cooperative Extension System, with more information found at: <http://www.uidaho.edu/ag/extension/>.

[Idaho One Plan] A multi-agency developed computerized planning tool which helps agriculturalists identify resource problems and conservation solutions to address these problems. Planning tools assist the user in selecting appropriate best management practices for crops, livestock and other categories. Additional information can be obtained from a regional NRCS field office, or electronically from the NRCS Conservation Partners website at: http://www.nrcs.usda.gov/programs/cons_ptnrs/partnerships.html and accessible at website <http://www.oneplan.org/index.htm>.

[Idaho River Ecological Assessment Framework] This document describes DEQ's ecological assessment approach to determine aquatic life use support in Idaho's rivers. April 2002. For more information, contact a DEQ regional office at: http://www.deq.state.id.us/AboutDEQ/reg_map.htm.

[Idaho Small Stream Ecological Assessment Framework] This document describes DEQ's ecological assessment approach to determine aquatic life use support in Idaho's small streams, utilizing biological indicators, habitat data, and numeric water quality criteria, April 2002. For more information, contact a DEQ regional office at: http://www.deq.state.id.us/AboutDEQ/reg_map.htm.

[Imhoff Cone Evaluation] Estimating Sediment Concentrations by Imhoff Cone in Runoff Water from Silt Loam. NRCS Engineering Tech Note Number 2, December 1981. Measures settleable material in a standard Imhoff cone, provides an onsite method for determining sediment concentrations. More information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) (<http://www.nrcs.usda.gov/technical/efotg/>).

[Indicators of Rangeland Health] Interpreting Indicators of Rangeland Health-Version 3. The information provides guidelines for qualitative assessments of rangeland health, developed by BLM, USGS, NRCS, and ARS. Technical Reference 1734-6, 2000. More information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) (<http://www.nrcs.usda.gov/technical/efotg/>).

[Manure Master Decision Support System] A NRCS tool used to compare nutrient content in animal manure on farms with the quantity of nutrients removed in the crops produced from it. More information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) (<http://www.nrcs.usda.gov/technical/efotg/>).

[Moisture Sensors] There are many commercial soil moisture sensors on the market. Soil moisture sensors are used to determine irrigation needs. Sensors include choices such as gypsum blocks, tensiometers, neutron probes, and the soil dielectric concept.

[National Irrigation Guide] Resource Planning and Evaluation Tools and Worksheets, Chapter 15, NRCS National Engineering Handbook. More information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) (<http://www.nrcs.usda.gov/technical/efotg/>).

[NLEAP] Nitrate Leaching and Economic Analysis Package is a field-scale computer model developed by NRCS and ARS to provide a rapid and efficient method of determining potential nitrate leaching associated with agricultural practices. It uses basic information concerning on-farm management practices, soils, and climate to project nitrogen budgets and nitrate leaching indices. NLEAP calculates potential nitrate leaching below the root zone and to ground water supplies. For more information, see the NRCS Idaho Engineering Programs website at: <http://www.id.nrcs.usda.gov/technical/engineering/engdwld.html>.

[Nutrient Management Standard] NRCS Nutrient Management Standard 590 provides guidance to preparing a nutrient management plan, including preparing a nutrient budget and evaluating nutrient supplies for plant production. Additional information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

[Onsite Observations] Follow up observations before and after implemented best management practices is one of the best sources of practices effectiveness documentation. Observations should be documented and stored in the cooperator's file, including information such as the technical merit of the practice and overall effectiveness. Use the following forms which are included in this document:

- [Standard Form III \(Nonirrigated Cropland\)](#)
- [Standard Form IV \(Irrigated Cropland\)](#)
- [Standard Form V \(Riparian and Wetland\)](#)
- [Standard Form VI \(Support Structure\)](#)

[Pasture Condition Score Sheet] NRCS Grazing Lands Technology Institute. NRCS Pasture Condition Score Sheet, May 2001, and accompanying NRCS Guide to Pasture Condition Scoring. Used to evaluate current pasture productivity and the stability of its plant community, soil and water resources. Also used to identify what treatment needs are required to improve a pasture's productivity to protect soil, water, and air quality. Additional information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

[PHAUCET] PHAUCET is a *Windows* based program design and evaluation tool for furrow irrigation systems. The program uses field and technical information to calculate existing system performance and define alternatives for improving irrigation efficiency. The model can be downloaded from the NRCS website for Irrigation - Water Management Models at: <http://www.wcc.nrcs.usda.gov/nrcsirrig/irrig-mgt-models.html>.

[Photographs] Photographs of installed best management practices are good tools for practices effectiveness documentation. Photo documentation of the site or situation before and after the practice is installed is also a cost effective, easy way to trace the effectiveness of the practices. It is important to label each photo with a location site description, date, and practice name.

[PFC] Proper Functioning Condition. Developed by BLM, a methodology for assessing the physical functioning of riparian-wetland areas. More information can be obtained by contacting a Idaho BLM field office at website: <http://www.id.blm.gov/whatwedo/grazing.htm>.

[Phosphorus Index] A NRCS site vulnerability assessment tool that helps determine the relative risk for offsite transport of phosphorus and for manure. The Phosphorus Index is a technique for making manure management decisions. The Phosphorus Index is a useful tool for prioritizing fields for the application of animal manure or other organic by-products that contains phosphorus. For more information, contact a regional NRCS field office, or see the NRCS Idaho Engineering Programs website at: <http://www.id.nrcs.usda.gov/technical/engineering/engdwld.html>.

[Protocol #8] Water Quality Monitoring Protocols - Report No. 8 Protocols For Classifying, Monitoring, and Evaluating Stream/Riparian Vegetation On Rangeland Streams. To obtain a copy of the protocol, or for more information, contact a DEQ regional office at:
http://www.deq.state.id.us/AboutDEQ/reg_map.htm.

[Quality Criteria] Idaho Technical Guide Notice Number 173. NRCS, September 2001. Section III—Resource Management Systems Quality Criteria. Additional information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at:
<http://www.nrcs.usda.gov/technical/efotg/>.

[Range and Pasture Handbook] Chapter 6 of the NRCS Range and Pasture Handbook. Additional information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

[RUSLE] Revised Universal Soil Loss Equation. Developed by the ARS and NRCS National Sedimentation Laboratory. A computerized program used to estimate average annual sheet and rill erosion on cropland. May also be used to evaluate erosion on rangeland, disturbed forest lands, and construction sites. Current version is v.1.06b. More information and software downloads can be found at the ARS National Sedimentation Laboratory website at:
<http://www.sedlab.olemiss.edu/models.html>.

[SISL] Surface Irrigation Soil Loss Equation. Predicting Irrigation Induced Soil Loss on Surface Irrigation Cropland. NRCS Idaho Technical Guide Notice Number 145, June 2000. A research-based model for predicting irrigation induced soil loss on surface irrigated cropland. Additional information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

[Site Assessment For Cattle Operations] **Standard Form VII**, provided in this document, can be used to undertake a site assessment for winter cattle feeding operations and AFO/CAFO determinations. This form is derived from the Winter Feeding, AFO/CAFO Site Assessment for Cattle Operations form found in the NRCS Animal Waste Manual Field Handbook, Idaho Supplement.

[SITES] Water Resources Site Analysis Program, Technical Release No. 20 is a computer program for Project Formulation Hydrology (TR-20). The program is a physically based watershed scale runoff event model. It computes direct runoff and develops hydrographs resulting from any synthetic or natural rainstorm. Developed hydrographs are routed through stream and valley reaches as well as through reservoirs. Hydrographs are combined from tributaries with those on the main stream stem. Branching flow (diversions), and base flow can also be accommodated. Additional information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

[Soil Conditioning Index] NRCS Soil Conditioning Index (NRCS Idaho Technical Guide Notice 198, dated December 2002). Agronomy Tech Note #24 with associated spreadsheet. A *Windows* based model used to predict the consequences of cropping systems and tillage practices on the status of soil organic matter in a field. Additional information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

[Soil Tests] Objectives of soil sampling are to determine the average nutrient status in a field and obtain a measure of nutrient variability in the field. When the variability is known, fertilizer application can be adjusted to more closely meet the supplemental nutrient needs of a crop for specific field areas. Correct fertilizer nutrient use can result in increased yield, reduced cost, and reduced potential water pollution. Soil sampling and testing can also be done post-harvest for monitoring purposes.

[Soil Quality Test Kit] The NRCS test kit includes the procedures for 12 diagnostic tests of the physical, chemical, and biological properties of soil. It includes worksheets for recording data and calculating results. It also lists types and sources of supplies needed to build a field test kit. The kit also provides information for evaluating, primarily for agricultural purposes, the results of each test in the kit. Additional information may be obtained from a regional NRCS field office at: <http://www.id.nrcs.usda.gov/contact/>.

[SVAP] Stream Visual Assessment Protocol. Biology Technical Note 29, used to determine if activities impact aquatic health and riparian/wetland function of surface water bodies. More information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

[TR-55] NRCS Technical Release 55 (TR-55) presents simplified procedures to calculate storm runoff volume, peak rate of discharge, hydrographs, and storage volumes required for floodwater reservoirs. These procedures are applicable in small watersheds, especially urbanizing watersheds, in the United States. For more information and software downloads, see the NRCS Idaho Engineering Programs website at: <http://www.id.nrcs.usda.gov/technical/engineering/engdwild.html>.

[VegSpec] VegSpec is a web-based decision support system that assists land managers in the planning and design of vegetative establishment practices. VegSpec utilizes soil, plant, and climate data to select plant species that are site-specifically adapted, suitable for the selected practice; and appropriate for the purposes and objectives for which the planting is intended. The program may accessed at the NRCS National Plant Data Center at: <http://npdc.usda.gov/document/>.

[Waste Management Field Handbook] NRCS Idaho Waste Management Field Handbook Notice No. 16 (NRCS 210-AWMFH, Idaho Supplement, April 2002). Includes a site assessment check list for AFO, CAFO, and/or winter feeding areas. Additional information may be obtained from a regional NRCS field office at: <http://www.id.nrcs.usda.gov/contact/>.

[Water Quality Assessment Guide] Water Body Assessment Guidance, Second Edition (WBAG II), describes the methods DEQ uses to evaluate data and determine beneficial use support of Idaho water bodies. To obtain a copy of the guidance document, or for more information, contact a DEQ regional office at: http://www.deq.state.id.us/AboutDEQ/reg_map.htm.

[Water Quality Indicators Guide] NRCS Water Quality Indicators Guide-Field Sheet 1B is used to determine if soils, drains, ditches and streams are managed so there is no excessive delivery of sediments to surface water bodies. Additional information may be obtained from a regional NRCS field office at: <http://www.id.nrcs.usda.gov/contact/>.

[Water Quality Testing] Water quality testing of physical and chemical parameters can be done with certified in-field test kits, or by a state certified laboratory. Physical water quality testing may include parameters such as turbidity, suspended solids, water temperature, etc. Chemical water quality testing may include parameters such as bacteriological analysis, nutrients, pH, dissolved oxygen, etc.

[WEPP] Water Erosion Prediction Project. A *Windows* based computer program that is a process-based, distributed parameter, continuous simulation, erosion prediction model. The current model (Version 2002.700) is best used on areas less than 640 acres in size, and does not apply to agricultural cropland fields or watersheds having incised, permanent channels. The model can be

used in rangeland and forest application where gullies occur. More information can be found at the hosting website: <http://forest.moscowfs.wsu.edu/enr/wepp0.html>.

[WEQ] Wind Erosion Equation. An ARS developed computer program used to estimate annual wind erosion on cropland. Additional information may be obtained at: <http://www.nal.usda.gov/ttic/tektran/data/000011/58/0000115868.html>.

[WinPST] Windows Pesticide Screening Tool. NRCS Idaho Technical Guide Notice Number 187, May 2002. Computer program (*Windows* based) used to evaluate the potential loss of pesticides by leaching and surface runoff. More information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

[Wildlife Quality] Wildlife Habitat Appraisal Guides for Idaho. NRCS Idaho Biology Technical Note (Tech Note No. 19, February 2003) that provides planners a means of determining the value of wildlife habitat on any conservation planning unit. More information may be obtained from a regional NRCS field office, or electronically from the [Idaho EFOTG site](http://www.nrcs.usda.gov/technical/efotg/) at: <http://www.nrcs.usda.gov/technical/efotg/>.

Glossary of Terms and Acronyms



ARS: US Department of Agriculture (USDA) Agricultural Research Service

BLM: US Department of the Interior (USDI) Bureau of Land Management

Feedback Loop Process: The feedback loop process is referenced and described in the Idaho Agricultural Pollution Abatement Plan (Ag Plan), A Guidance Document Addressing Nonpoint Source Water Quality Pollution, March 2003. The process is a mechanism for overall nonpoint source pollution management based on the implementation and evaluation of BMPs.

FSA: United States Department of Agriculture Farm Service Agency

GIS: Geographic information system

HUC: Hydrologic Unit Code. A common and widely accepted approach is that defined by the USGS where the nation is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The first level of classification divides the nation into 21 major geographic areas, or regions. These geographic areas contain either the drainage area of a major river, or the combined drainage areas of a series of rivers. The second level of classification divides the 21 regions into 222 subregions. A subregion includes the area drained by a river system, a reach of a river and its tributaries in that reach, a closed basin(s), or a group of streams forming a coastal drainage area. The third level of classification subdivides many of the subregions into accounting units. These 352 hydrologic accounting units nest within, or are equivalent to, the subregions. The fourth level of classification is the cataloging unit, the smallest element in the hierarchy of hydrologic units. A cataloging unit is a geographic area representing part of, or all of, a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature. These units subdivide the subregions and accounting units into smaller areas. More information is available on the USGS website:
<http://water.usgs.gov/GIS/huc.html>.

SCC: Idaho State Department of Agriculture (ISDA) Idaho Soil Conservation Commission

TMDL: Total Maximum Daily Load

NRCS: US Department of Agriculture (USDA) Natural Resources Conservation Service

USGS: US Department of the Interior (USDI) United States Geological Survey

Standard Forms



STANDARD FORMS

Standard forms found in this section include:

- | | |
|-----------|---|
| Form I. | BMP Effectiveness Evaluation Field Sheet |
| Form II. | Client Interview |
| Form III. | Onsite Observation: Nonirrigated Cropland |
| Form IV. | Onsite Observation: Irrigated Cropland |
| Form V. | Onsite Observation: Riparian and Wetland |
| Form VI. | Onsite Observation: Support Structure |
| Form VII. | Site Assessment for Cattle Operations |

Form I. BMP Effectiveness Evaluation Field Sheet

| | | | | | | | |
|--|-----------------------|-----------------------|--|--|-----------------------------|-----------------|--------------|
| (1) SCD: | PROJECT # | HUC# | TRACT/FIELD#/ACRES: | CONTRACT # | DATE: | | |
| OWNER/OPERATOR: | | | STREAM: | PROGRAM: | | | |
| REVIEWER(s): | | | | | | | |
| (2) Type of Operation: Non-irrigated Cropland <input type="checkbox"/> Animal Waste Management <input type="checkbox"/> Irrigated Cropland <input type="checkbox"/> Riparian/Wetland <input type="checkbox"/> Grazing <input type="checkbox"/> | | | (9) Effectiveness: 5..... Excellent protection of water quality resources 4..... Improved protection of water quality over pre-project conditions 3..... Practice is partially effective. Needs minor modification 2..... Practice is partially effective. Needs significant modification 1..... Practice is not effective. Needs to be replaced NR.... Not reviewed NA.... Not applicable | | | | |
| (3) Applied Practices to be Reviewed: | (4) Structural | (5) Management | (10) O&M (1 - 5): | (11) Effectiveness (1 - 5) (A) Surface: (B) Ground: | (12) Stream Channel: | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| (6) Implementation: Meets Plans and Specifications? Yes <input type="checkbox"/> No <input type="checkbox"/> | | | <i>For effectiveness scores less than 4: If impacts reach a stream channel mark the correct (effectiveness) column with an X.</i> | | | | |
| (7) Supporting Documentation: | | | (13) | Sediment | Nutrients | Bacteria | Other |
| | | | <u>Pollutants of Concern:</u> | | | | |
| | | | <u>Estimated Reductions:</u> | | | | |
| (8) Operation and Maintenance: 5..... Maintenance exceeds standards and specifications 4..... Maintenance meets standards and specifications 3..... Minor departure from intent of contract/practice 2..... Major departure from intent of contracts/practices 1..... Gross neglect of contract/practices or practices removed | | | (14) Progress in Application of Resource Management System: <i>(Measured by Percentage of Application Completed)</i> Excellent (75% - 100%) <input type="checkbox"/> Good (50% - 75%) <input type="checkbox"/> Fair (20% - 50%) <input type="checkbox"/> Poor (0% - 25%) <input type="checkbox"/> | | | | |
| (15) Recommendations: | | | (16) Comments: | | | | |

Form I. BMP Effectiveness Evaluation Field Sheet [Instructions]

Section

- (1) This section of the form is comprised of basic information pertaining to location, date, and identification of field review team.
- (2) Type of operation is indicated by placing a check mark within the brackets next to the appropriate activity designation. Space is available for notes.
- (3) Applied practices to be reviewed are selected from the contract and listed in this section.
- (4) & (5) Selected practices to be reviewed are identified as structural or management by placing a check under the appropriate heading.
- (6) & (7) These sections are used to validate proper implementation that meets plans and specifications.
- (8) Operation and maintenance will be evaluated in the field and rated according to the criteria on the field sheet. The rating score will be entered for each practice in section 10.
- (9) Effectiveness of the installed practices will also be evaluated in the field using appropriate supporting data sheets, field measurements and modeling techniques. This information will be used for rationale for the effectiveness rating.
- (10) Operation and maintenance rating scores are entered in this column to correspond with the listed practices.
- (11) Effectiveness rating scores are to be entered in column A for surface water impacts or column B for groundwater impacts corresponding with the listed practices.
- (12) Place an X in the stream channel column corresponding to the listed practices that score less than a 4 on the rating criteria and where a direct impact to the stream occurs.
- (13) Place a check under the identified pollutants and any estimates of reduction by the practice. Provide any comments as needed.
- (14) This item is used to evaluate progress toward achieving a complete Resource Management System on the field evaluated. Place a check in the appropriate box indicating percentage of application completed.
- (15) Recommendations are key to implementing and closing the feedback loop process at the field level.
- (16) Provide any notes or comments and references to photos, etc.

Form II. Client Interview

Date of Observation: _____ Observation Made By: _____

Identification of Area (Producer's name, location, tract, field, etc.) _____

Client's Observation:

| Best Management Practice | Rating* | Comments | Is Practice Effectively Meeting Intended Purpose? |
|--------------------------|---------|----------|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

- * (1) Satisfied with overall practice effectiveness
(2) Moderately satisfied with overall practice effectiveness
(3) Dissatisfied with overall practice effectiveness

Clients Comments:

| Best Management Practice | Technical Merit of Practice^ | Benefits of Practice Outweigh Overall Cost of Practice [Yes or No] | Comments |
|--------------------------|------------------------------|--|----------|
| | | | |
| | | | |
| | | | |
| | | | |
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| | | | |
| | | | |

- ^ (1) Practice technically sound for region; adequately addresses resource concern
(2) Practice technically sound, but not applicable to this region
(3) Practice not technically sound; does not address resource concern

Limiting Factors (climate, soils, equipment, economics, existing farm programs, etc.)

Form III. Onsite Observation: Nonirrigated Cropland

Date of Observation: _____ Observation Made By: _____

Identification of Area (Producer's name, location, tract, field, etc.) _____

Timing of Inspection: During critical erosion period? _____

During/immediately following runoff event? _____

Are residue requirements being met? _____

Is adequate contour farming occurring? _____

Are support structures in place (grassed waterways, water and sediment control structures, filter strips, etc.)? _____
_____Are support structures being negatively impacted by tillage operations? _____

Is crop uniform throughout the field? _____

Is the tillage operation itself causing erosion? _____

Are rills occurring? _____ Degree of rill formation: _____

| Extreme | Moderate | Slight |
|--|---|--|
| Rill formation is severe and well defined throughout most of the area. | Rill formation is moderately active and well defined throughout most of the area. | Active rill formation is slight at infrequent intervals. No recent formation of rills; old rills have blunted or muted features. |

Are gullies occurring? _____ Degree of gully formation: _____

| Extreme | Moderate | Slight |
|--|---|---|
| Gullies common with indications of active erosion and down-cutting. Nickpoints and headcuts are numerous and active. | Moderate to common formation of gullies with indications of active erosion. Headcuts are active; downcutting is not apparent. | Gullies uncommon, no new signs of active headcuts or nick points. Old gullies have blunted or muted features, and/or are eroded to a stable bottom. |

Form III. Onsite Observation: Nonirrigated Cropland (page 2)Is sediment deposition occurring onsite? ____ Degree of visual sedimentation: ____

| Extreme | Moderate | Slight |
|--|---|--|
| Significant alluvial fans deposited on gradual or flat slope within field, and/or visual signs of recent sediment deposition in nearby receiving stream. | Some recent sediment deposition visibly occurring onsite. | Infrequent sediment deposition onsite. |

Is sediment deposition occurring offsite? ____ Degree of visual sedimentation: ____

| Extreme | Moderate | Slight |
|--|--|--|
| Significant sediment deposited in nearby receiving stream. Sediment visible on at toe slope of streambank and/or on streambed. | Receiving stream shows visual signs of turbidity near runoff entry point. Sediment delivery points actively eroding. | Sediment delivery points stable and not actively eroding. Small amounts of newly deposited sediment in receiving stream. |

Other observations onsite: _____

Are practices effectively meeting intended purpose? _____

Follow up actions needed: _____

Best management practice recommendations made: _____

Photos taken? _____ Photos archived at: _____

Form IV. Onsite Observation: Irrigated Cropland

| | | | |
|--|---|--------------------------------------|---|
| Date of Observation: | | Observation Made By: | |
| Owner/Operator: | | Field/Tract: | |
| | | | |
| IRRIGATION | | | |
| Irrigation Type: | Corrugates/Furrows <input type="checkbox"/> | Border <input type="checkbox"/> | Sprinkler <input type="checkbox"/> Micro <input type="checkbox"/> |
| Delivery System: | Siphon Tubes <input type="checkbox"/> | Wheel Lines <input type="checkbox"/> | Surge <input type="checkbox"/> Drip <input type="checkbox"/> |
| | Cuts <input type="checkbox"/> | Gated Pipe <input type="checkbox"/> | Center Pivot <input type="checkbox"/> Handlines <input type="checkbox"/> |
| Efficiency of Existing System: | % | Area irrigated: | acres |
| General Maintenance of System: | | | |
| | | | |
| Is an IWM plan in place and available? YES <input type="checkbox"/> NO <input type="checkbox"/> | | | |
| | | | |
| WATER | | | |
| Water Source: | | | |
| Availability: | Continuous <input type="checkbox"/> | Demand <input type="checkbox"/> | Rotation <input type="checkbox"/> Fixed Schedule <input type="checkbox"/> |
| How is irrigation schedule/amount determined? | | | |
| | | | |
| How is water flow rate measured? | | | |
| | | | |
| Irrigation scheduling methods? | | | |
| | | | |
| | | | |
| CROPS | | | |
| Current Crop: | | Average Root Depth: | |
| Age of Planting: | | Stage of Crop: | |
| Cultivation & other Cultural Practices: | | | |
| | | | |
| Field Condition (Smoothed, leveled, laser leveled, etc.): | | | |
| Average Down-slope: | | Average Cross-slope: | |

Form IV. Onsite Observation: Irrigated Cropland (page 2)

| SOILS | | | | | | | |
|--|---------|-----------------------------|-------------|---|--------------|--------------|-------|
| Map Symbol: | | Percentage of field: | | % | Area: | | acres |
| Soil Series & Surface Texture: | | | | | | | |
| | | | | | | | |
| Depth | Texture | | AWC (in/in) | | AWC (in) | Cum AWC (in) | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Depth to water table or restrictive layer: | | | | | | | |
| Intake Family/intake group/max application rate: | | | | | | | |
| Comments: | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Limiting Factors (Climate, soils, equipment, economics, existing farm programs, etc): | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Field Observations: | | | | | | | |
| System Condition: | | | | | | | |
| Crop Uniformity: | | | | | | | |
| Uniformity of advance across field: | | | | | | | |
| Soil Compaction: | | | | | | | |
| Evidence of Erosion or Sedimentation: | | | | | | | |
| System Leaks: | | | | | | | |

Form IV. Onsite Observation: Irrigated Cropland (page 3)

| | |
|---|--|
| Other Notations: | |
| Furrow Conditions: | |
| Method of collection and disposal of field runoff: | |
| | |
| Final destination of runoff water: | |
| | |
| Impacts of drainage system: | |
| | |
| Other onsite observations: | |
| | |
| | |
| Are practices effectively meeting intended purposes? | |
| | |
| | |
| Follow-up actions: | |
| | |
| | |
| Best management practice recommendations made: | |
| | |
| | |
| | |
| Photos Taken? YES <input type="checkbox"/> NO <input type="checkbox"/> | |
| Location of Archived Photos: | |

Form V. Onsite Observation: Riparian and Wetland

Date of Observation: _____ Time of Inspection: _____

Observation Made By: _____

Identification of Area (Stream's name, stream reach, project reference, etc.) _____

Practices Installed at Time of Investigation:

| | |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

Riparian Vegetation: _____ % Tree and shrubs
 _____ % Sedges/rushes
 _____ % Grasses/forbs
 _____ % Other

Bank Vegetation: _____ % Perennial/rock
 _____ % Annual/perennial
 _____ % Annual/bare
 _____ % Mostly bare

Bank Stability: _____ % Covered/stable
 _____ % Bare/stable
 _____ % Covered unstable
 _____ % Bare/unstable

Bank Erosion: _____ % No erosion Bed Erosion: _____ % No erosion
 _____ % Erosion/cracking _____ % Minor erosion
 _____ % Slumps/clumps _____ % Headcut
 _____ % Scour

Degree of visual sediment contribution: _____

| Extreme | Moderate | Slight |
|---|---|--|
| Significant sediment deposited in receiving stream. Sediment visible on at toe slope of streambank and/or on streambed. | Receiving stream shows visual signs of turbidity near runoff entry point or streamside activity. Sediment delivery points actively eroding. | Sediment delivery points stable and not actively eroding. Small amounts of newly deposited sediment in receiving stream. |

Livestock/Wildlife Access: No Impact _____ Minor Impact _____ Major Impact _____

Discussion: _____

Form V. Onsite Observation of Riparian and Wetland (page 2)

Riparian Vegetation Utilization: Herbaceous Species ____% Woody Species ____%

Discussion: _____

Herbaceous Vegetation Stubble Height:

< 4 inches ____% 4 to 12 inches ____% > 12 inches ____%

Tree/Shrub Regeneration: ____ Abundant ____ Typical
 ____ Scarce ____ Absent

Riparian Vegetation Buffer Width: ____ Less than 1 channel width
 ____ Between 1 and 2 channel widths
 ____ Greater than 2 channel widths

Wetland Observations:

Wetland functional value (water quality improvements, flood plain, wildlife habitat, etc.):

Diversity of wetland plant community: _____

Existing or observed threats to wetland: _____

Other observations onsite: _____

Are practices effectively meeting intended purpose? _____

Follow up actions needed: _____

Best management practice recommendations made: _____

Photos taken? _____ Photos archived at: _____

Form VI. Onsite Observation: Support Structure

Date of Observation: _____ Observation made by: _____

Identification of Area (Producer's name, location, tract, field, etc.) _____

_____ Year Structure Was Installed: _____

Timing of Inspection: During critical erosion period? _____
During/immediately following runoff event? _____

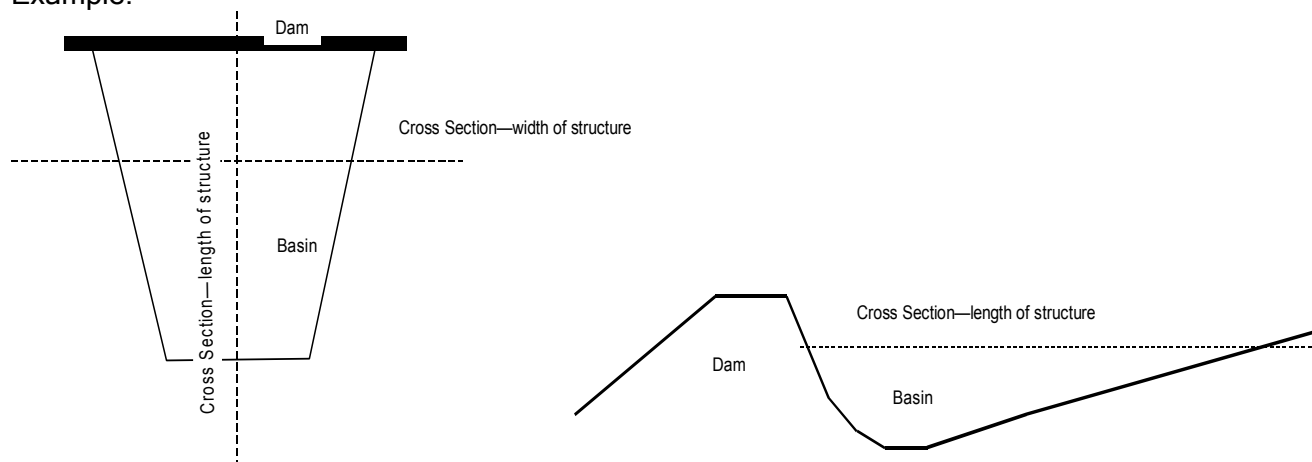
Sediment Retention Support Structure

Sediment Retention Support Structure Observed: _____

Visual Observations (sedimentation occurring in structure, overall structure stability, adequate maintenance, etc.):

Quantified Amount of Sediment Trapped by Structure:¹ _____

Example:



Best management practice recommendations made: _____

¹ Survey points established onsite. Follow up survey allows for quantification of overall sediment retained in structure by volume, reported in cubic feet. Establish a bench mark onsite then perform at least two cross sections, one representing the length of the structure, one representing the width. Resurvey in subsequent years, tying the survey back to the original bench mark for comparison.

Form VI. Onsite Observation: Support Structure (page 2)

Concentrated Flow Control Structure

Concentrated Flow Control Structure Observed: _____

Visual Observations (continued gully erosion below structure, overall structure stability, adequate maintenance, etc.):

Quantified Amount of Erosion:² _____

Other observations onsite: _____

Follow up actions needed: _____

Best management practice recommendations made: _____

Grade Stabilization Structure

Grade stabilization structure observed: _____

Visual Observations (continued headcutting, streambank instability, active erosion, overall structure stability, adequate maintenance, etc.):

Estimated Amount of Erosion: _____

Other observations onsite: _____

Are practices effectively meeting intended purpose? _____

² The quantity of gully erosion (reported in tons) is estimated by the following equation:
(W x D x L x Wt.) ÷ 2000 pounds/ton Where: W=width, D=average depth, L=length, and Wt.=weight of 1 cubic foot of soil from representative area.

Form VI. Onsite Observation: Support Structure (page 3)

Follow up actions needed: _____

Best management practice recommendations made: _____

Photos taken? _____ Photos archived at: _____

Form VII. Site Assessment for Cattle Operations

Site Data:

Site Description: _____

Slope of Site: _____ Representative Soils: _____

Briefly describe the containment/feeding scenario, including a description of the number and kind of animals:

If land application of wastes occurs, describe the procedure used:

Operation Definition:

Define whether site can be defined as a CAFO or AFO (using the NRCS Animal Waste Management Field Handbook, Idaho Supplement).

Site is defined as _____ Large CAFO _____ Medium CAFO _____ Small CAFO
_____ AFO _____ Winter Feeding Operation

Best management practice recommendations made: _____

Photos taken? _____ Photos archived at: _____

Form VII. Site Assessment for Cattle Operations (page 2)

The following table is designed to help the producer and planner identify resource problems onsite. An affirmative answer (✓) in any shaded block identifies a potential water quality resource concern that needs to be corrected.

| Item | Y | N | Comments |
|--|---|---|----------|
| 1. Does the feeding area support perennial vegetation of annually seeded vegetation: a. Over the entire area? b. Over a portion of the area? c. No vegetation is found. | | | |
| 2. Does precipitation or snowmelt leave the AFO/CAFO and enter waters of the state/US? | | | |
| 3. Does precipitation or snowmelt leave the winter feeding area? | | | |
| 4. Do livestock have direct access to waters of the state/US from any kind of site? | | | |
| 5. Is vegetation in the riparian zone impacted by livestock? | | | |
| 6. Are there off-channel livestock watering facilities? | | | |
| 7. Does upland runoff flow through the feeding area? | | | |
| 8. Is there roof runoff within the feeding area? | | | |
| 9. Does roof runoff flow through the feeding area and offsite? | | | |
| 10. Is there a vegetative buffer zone between the feeding area and waters of the state/US? Describe vegetative species, condition and width. | | | |
| 11. Are solid wastes or a portion of solid wastes stockpiled in the feeding area? | | | |
| 12. Will runoff from stockpiled waste flow offsite? | | | |
| 13. Do liquid wastes flow offsite? | | | |
| 14. Are liquid wastes from the feeding area contained? | | | |
| 15. Does land application of waste occur? | | | |
| 16. Is the site subject to flooding? | | | |